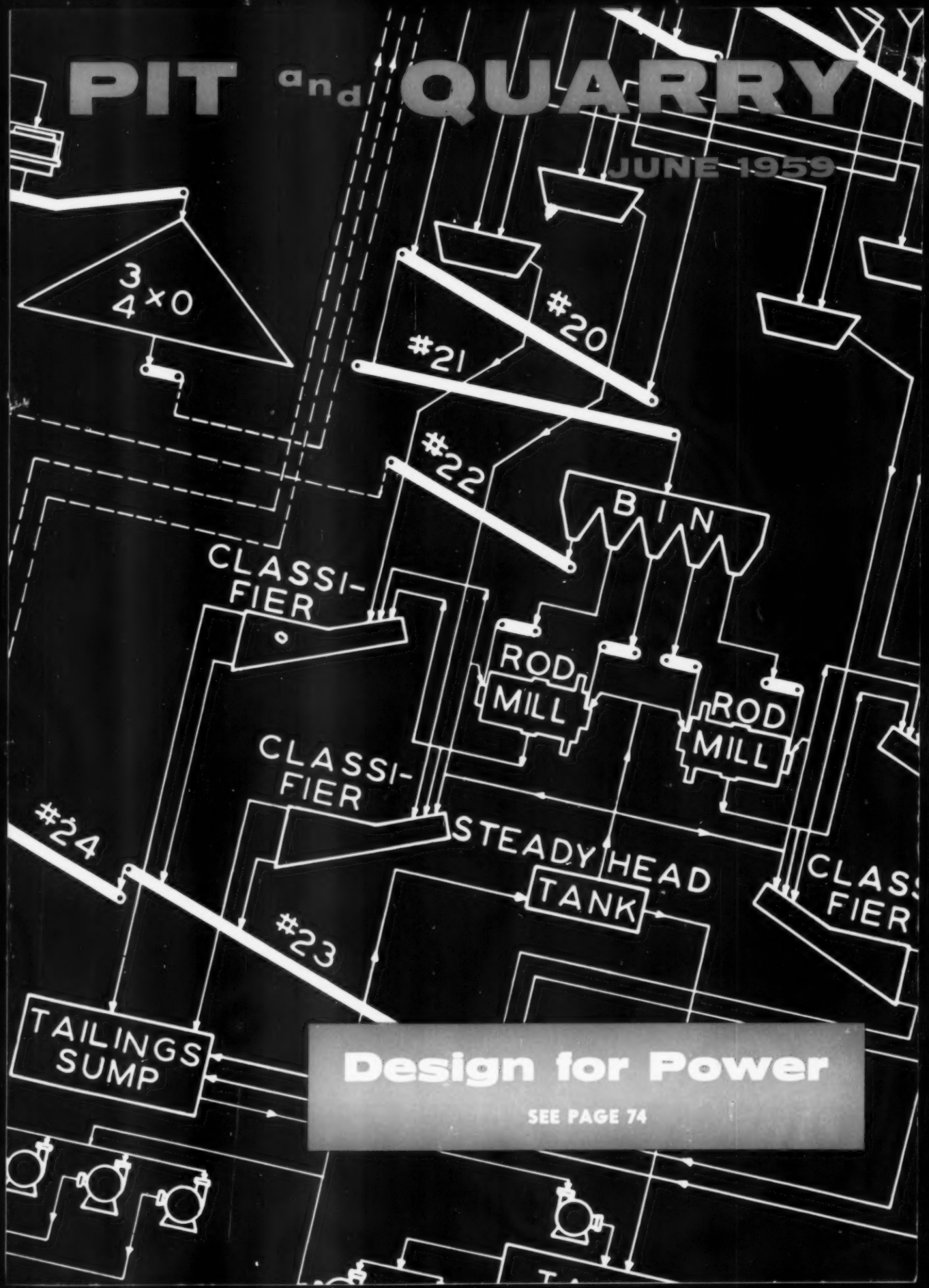
PIT and QUARRY

JUNE 1959



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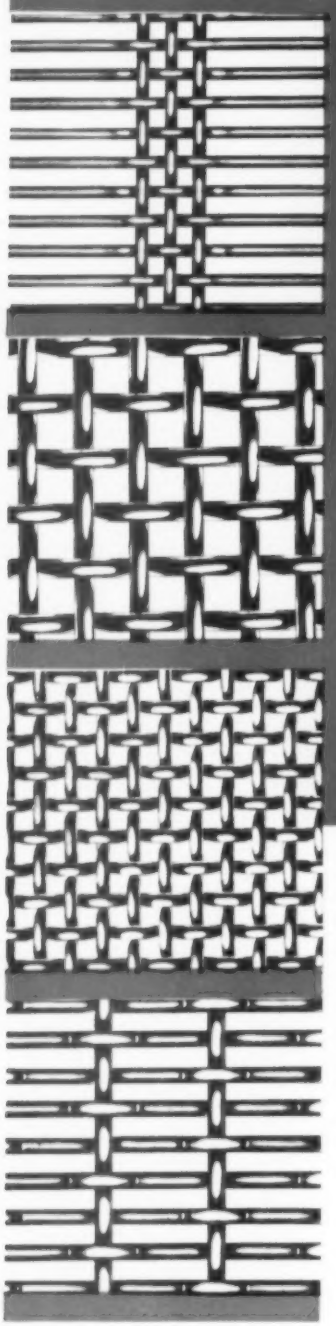

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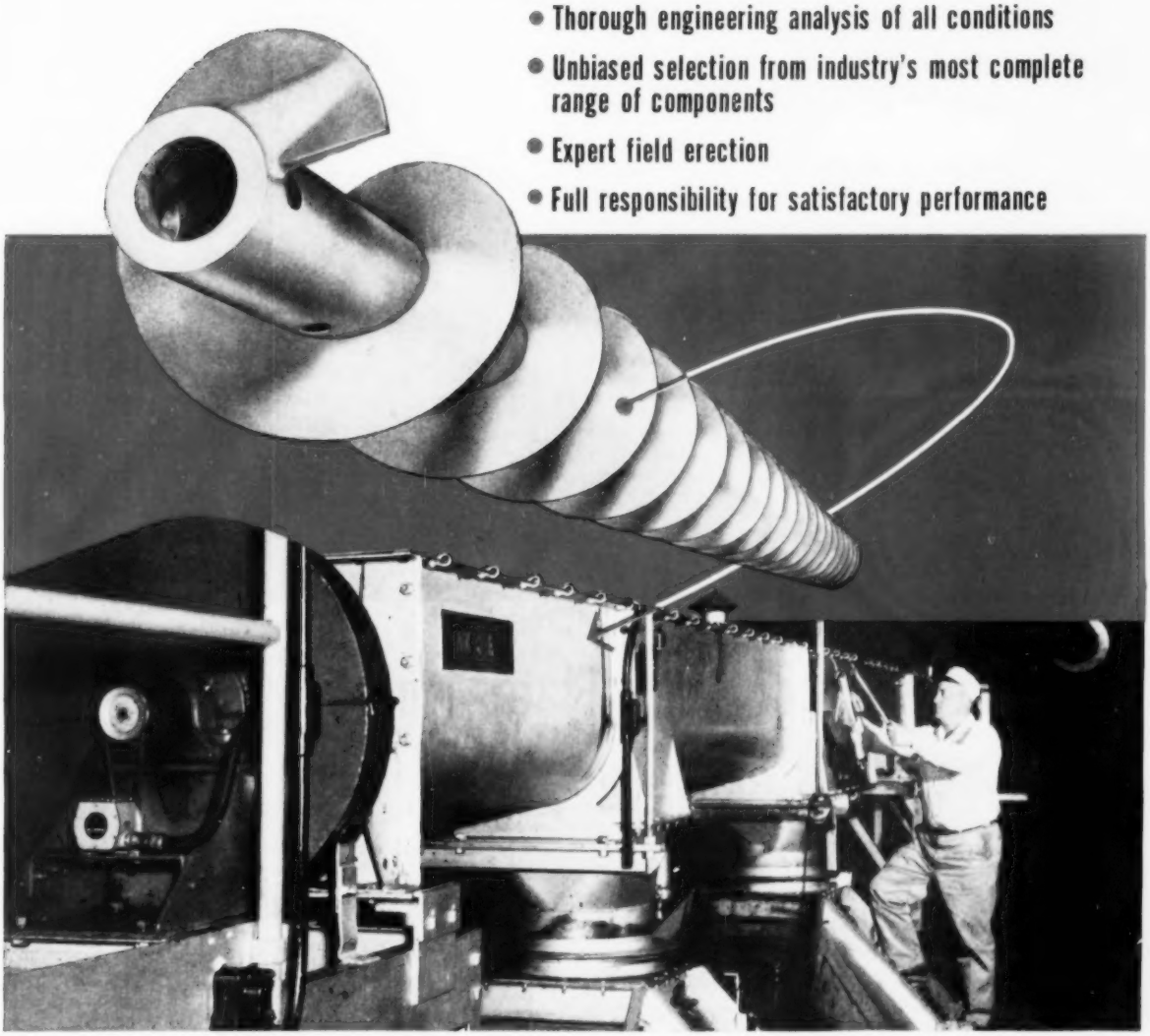

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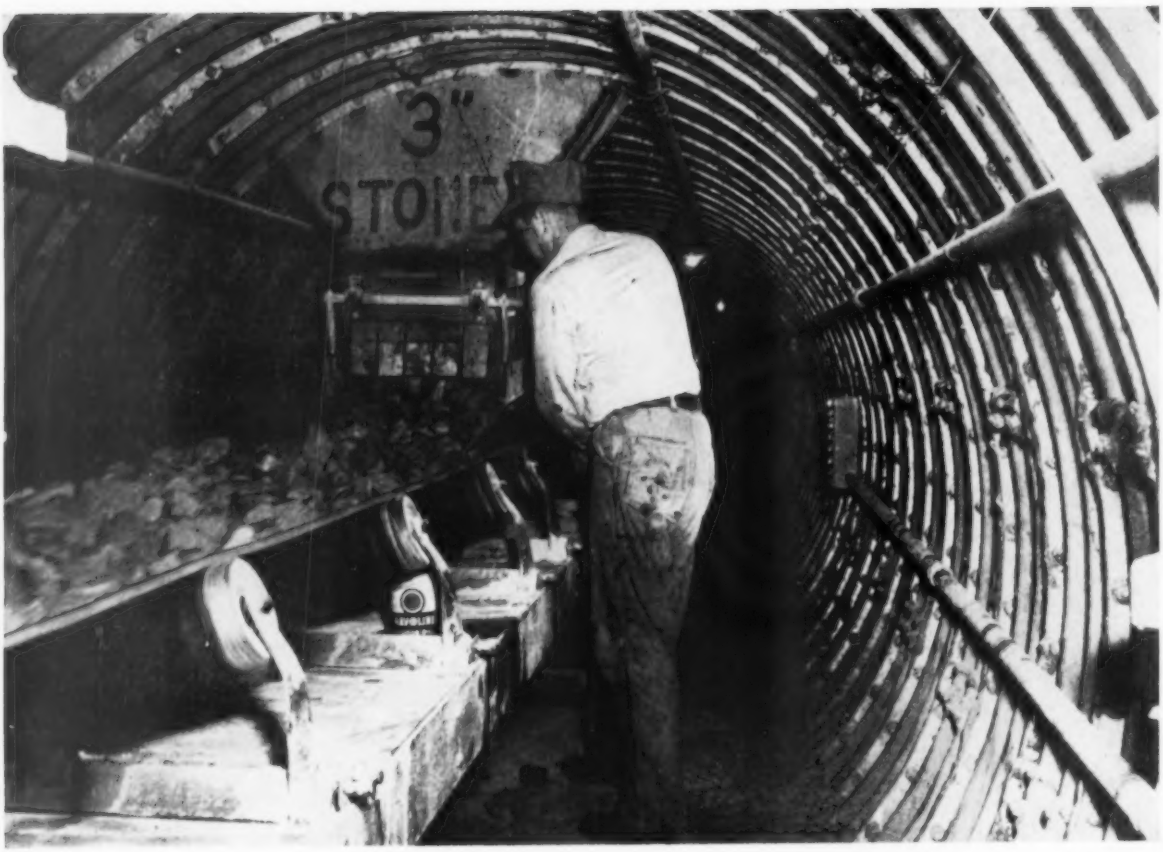

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PIT and QUARRY

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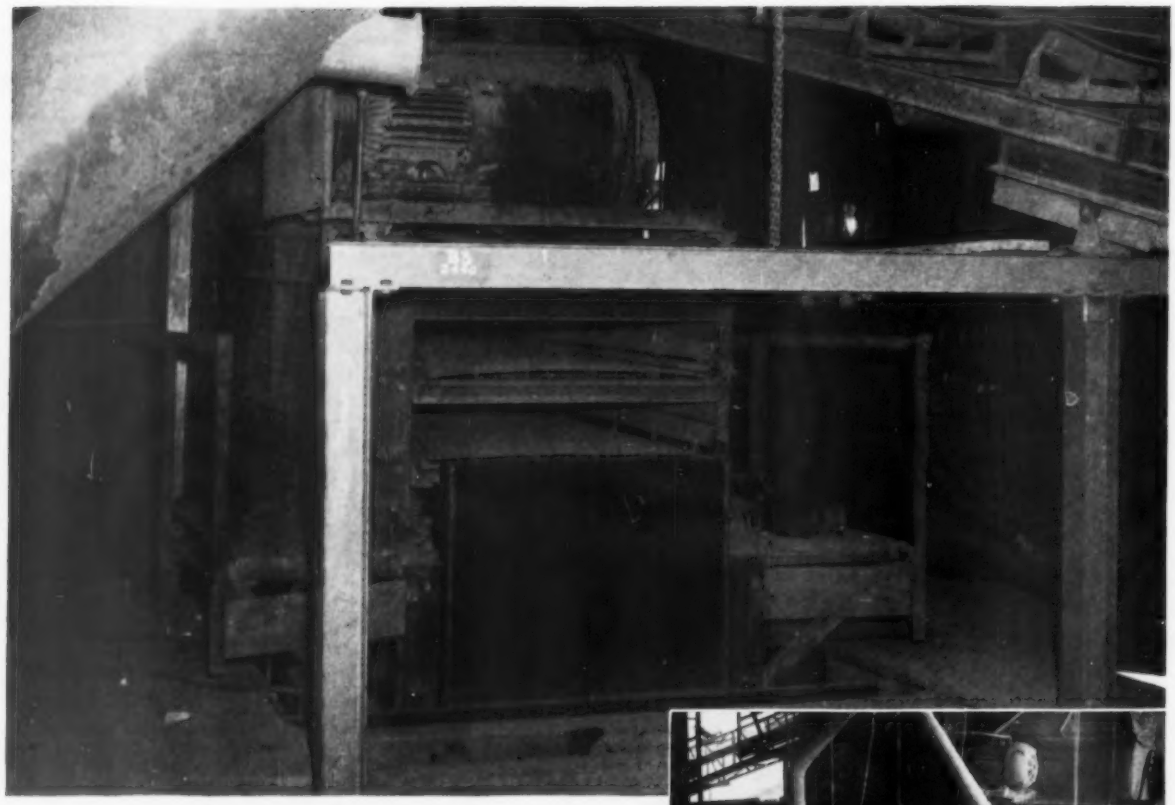

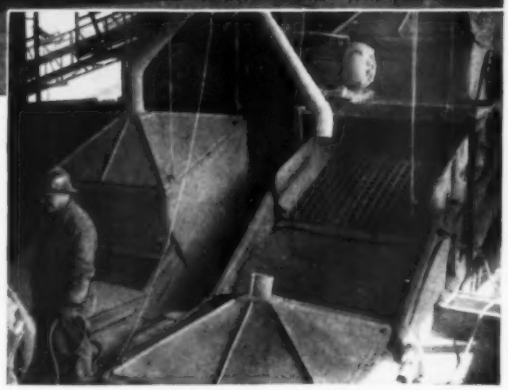

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Houdaille Construction Materials, Inc. of Morristown, N. J. is one of the largest aggregates producers in the east with a total of 28 crushed stone, sand and gravel, ready-mix concrete and bituminous plants.

At three of Houdaille's stone crushing plants in New Jersey, nine Deister Vibrating Screens are helping keep production at peak capacity. The Bound Brook plant, for example, has five Deisters in continuous operation. One of these is a triple-deck 5' x 18' Type UF *horizontal screen*, handling a feed of 350 to 450 tons per hour. It has been screening out three sizes of coarse aggregates for 2½ years . . . with no breakdowns due to mechanical malfunction.

A few miles away in the company's Summit, N. J. plant, a two-deck 4' x 10' and a three-deck 5' x 10' have been giving excellent service for more than six years. Equally impressive is the performance record of a three-deck 5' x 10' Deister at Houdaille's Millington plant.

Richard Hixon, Bound Brook plant superintendent, says: "We've had nothing but good luck with our Deisters." E. A. Frentz, superintendent at the Summit plant, adds: "Except for an occasional bearing replacement [average bearing life is 8000 hours], our Deister Screens have given us no maintenance problems in six years of continuous operation."

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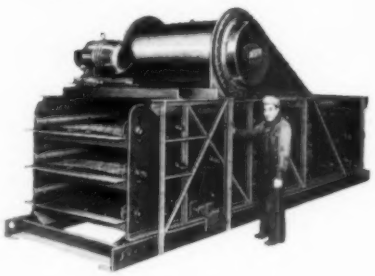
Above: Three-deck Deister Type UF Horizontal 5'x18' Screen at Bound Brook. *Inset:* Two double-deck 5'x14" Deister Type UHS Screens.



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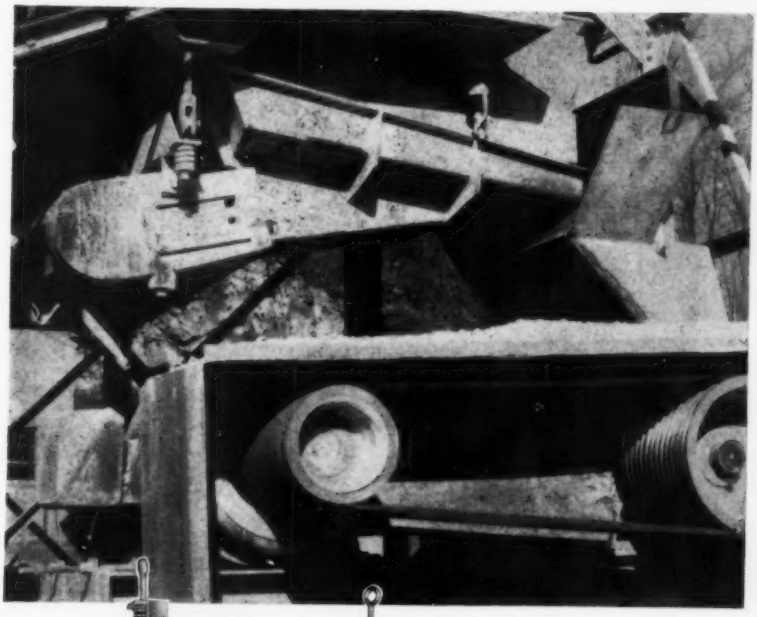
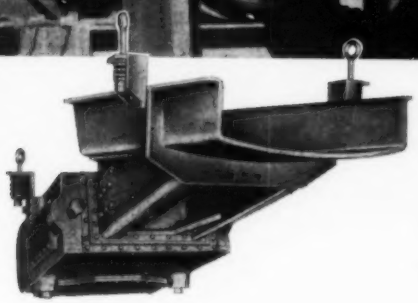
VIBRATORY FEEDERS





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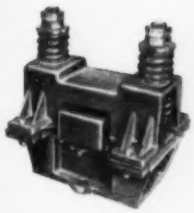

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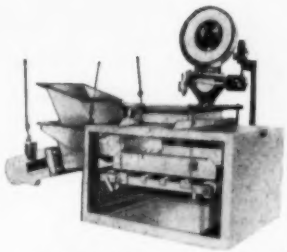

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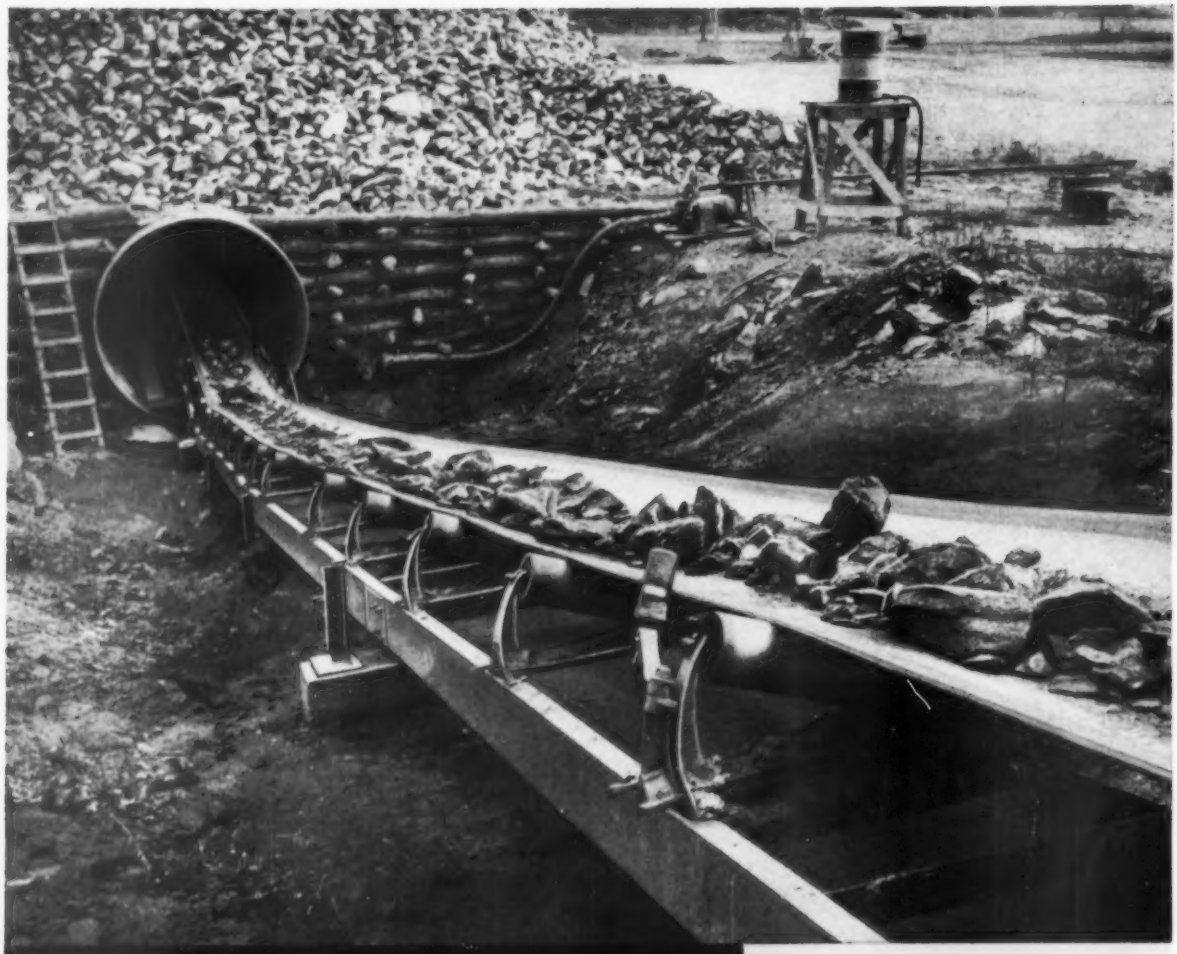

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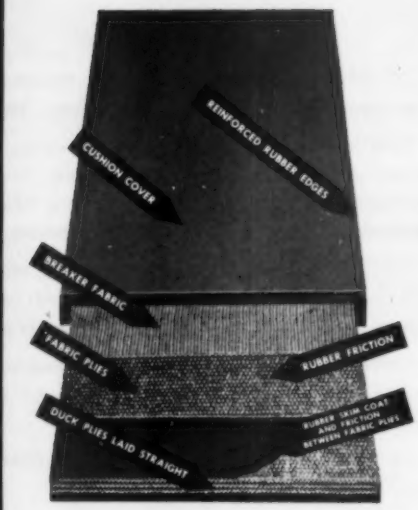

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Washington News Letter

By S. HERBERT UNTERBERGER

Economic Growth

WHEN ex-President Truman's and President Eisenhower's top economic advisers agree on something, that should be news. This is exactly what happened very recently.

For some time Leon Keyserling, chairman of the President's Council of Economic Advisers during the Truman administration, has been repeating the statement that if the United States economy is to grow and prosper, it will have to create a large number of additional employment opportunities. In his view, this can be accomplished only if we raise the rate of our national output, that is, our Gross National Product, from the post-World War II level of an average of 3 percent a year to a new level of 5 per cent a year.

In referring to the gross national output, Mr. Keyserling is not talking about it in terms of its dollar value. It is easy to increase its dollar value simply by having more inflationary price increases. Clearly, he is talking about the Gross National Product in real terms, that is, in terms of the actual quantities of goods and services being produced in the nation.

Recently a reporter from the *U. S. News and World Report* asked the current chairman of President Eisenhower's Council of Economic Advisers, Raymond J. Saulnier, the following question:

"If we are going to have prosperity and relatively full employment during the next five years, how many jobs do we have to create?"

Mr. Saulnier replied: "We will need to create a lot of jobs. That's clear when you consider what is likely to happen to our labor force. At the present time, 700,000 to 800,000 additional men and women enter our labor force every year. But this is going to increase. The best professional judgment is that around 1965 the increase will be around 1.1 million to 1.2 million a year. And in the decade between 1965 and 1975 we may be adding to our labor force at the rate of 1.4 million a year, about double the present rate. These are obviously going to be very challenging years. I'm sure of that."

He was then asked, "How many jobs does that require, all told, between now and 1965, if you figure that unemployment will be held to a level of, say, 3 million or 3.5 million?" Mr. Saulnier answered, "Well over 6 million by 1965, and close to 15 million more, possibly, in the following decade."

And then the logical next question was put to him: "Will there be enough jobs if the country's business grows at the average rate of the post-war period? Or do we need to grow faster to assure full employment?" Interestingly enough, Mr. Saulnier's answer does not appear to be any different from the one Mr. Keyserling would have given. "We will have to grow somewhat faster if reasonably full employment is to be assured." he declared. "But that growth should be possible if we follow policies that promote growth."

It is this final sentence which reveals the principal difference in the approach of these two men whose ostensible goal appears to be identical. The difference is in the policies which they recommend to promote economic growth.

Even here the differences are not of kind, but rather of degree. Both recognize that government, particularly the Federal Government, has a key role in promoting economic growth. Mr. Keyserling, of course, representing a New Deal or Fair Deal philosophy, would have the government engaging in direct action to accomplish this end. Whenever private industry fails to create the necessary jobs, he would have government filling the gap with road building, school building, airport building, and hospital building programs.

Mr. Keyserling would also have government distributing additional purchasing power to those with inadequate means, the aged, the infirm, dependent children, and perhaps even the downright lazy. He would favor having the government "in there pitching" against every restrictive economic practice, except perhaps those of labor unions, an issue upon which he has been relatively inarticulate.

He would, presumably, resolve all narrow decisions with respect to monetary policy in favor of programs of money and credit control which would encourage economic expansion even if, in the process, he risked a little more inflation.

As might be expected, Mr. Saulnier takes a somewhat different position. In his view, the role of government is a far more passive one. He believes that government should help to create the environment in which private industry will be willing, even eager, to provide the necessary jobs and the accompanying economic growth. Jumping in with its own programs, while not ruled out completely, would be a last resort action on the part of the Federal Government.

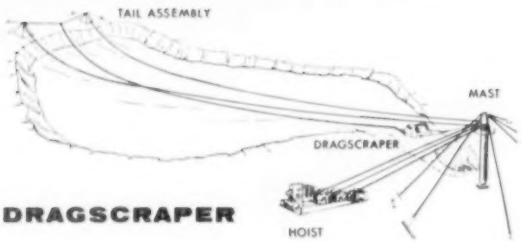
Similarly, Mr. Saulnier would probably feel that the distribution of additional purchasing power

(*Continued on page 65*)

Cut Materials Handling Costs in Half . . . Dig *and Haul* with a Sauerman Machine

Operating costs as low as 6¢ per ton are reported by Sauerman DragScraper and Slackline Cableway owners. This cost includes labor, power and maintenance when digging free-caving material on average haul distances.

When you use a Sauerman DragScraper or Slackline Cableway, one machine does *both* digging and hauling from deposit to plant. No double handling is required. You cut labor and equipment costs in half—or even more—because a single Sauerman Machine, controlled by one man, replaces the multiple equipment needed for other methods.

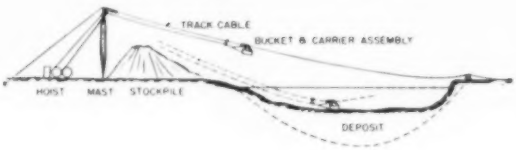


DRAGSCRAPER

DragScrapers are usually recommended for bank or pit deposits. They dig from hillsides or underwater as easily as on level ground and can haul directly to hopper or field conveyor. The Sauerman DragScraper hoist is designed for continuous duty and many years of service. The operator's control station may be remotely located for maximum visibility of deposit and plant.

DragScrapers are built in sizes from 1/3 to 15 yds. to satisfy practically all tonnage requirements.

SLACKLINE CABLEWAY



When deep digging is required or anticipated in the future, a Sauerman Slackline is usually best for the job. This powerful excavator can dig 100 ft. below water, lift its load and deliver the material to a stockpile on a 1000-ft. span.

The Slackliner Bucket inhauls at high speed and dumps automatically. Dumping point is determined by a stop button on the track cable. Gravity returns the bucket to the digging point, completing the fast operating cycle.

The use of a stockpile permits a single 2-yd. Slackline Cableway to handle the material requirements of a 200-tph. plant. Slacklines are built in sizes up to 3½ cu. yds.

★

Find out how you can save with a Sauerman Machine. Write or call, giving tonnage requirements and a description of your deposit. Sauerman engineers will supply their recommendations on the most economical machine for you.

SAUERMAN BROS., INC.

50th Anniversary Year

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Linden 4-4892 · Cable CABEX—Bellwood, Illinois

CRESCENT DRAGSCRAPERS • SLACKLINE AND TAUTLINE CABLEWAYS • DUROLITE BLOCKS

Labor Developments

The Issue in Steel

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D. C.-Philadelphia, Pa.

THE expiration of the labor agreement in the basic steel industry on June 30 faces the nation with one of its perennial labor-management crises. The fact that both sides recognize that this is no private affair was obvious many months ago when they both began the job of enlisting public opinion.

Principal beneficiaries so far have been the newspapers and the radio and television stations. Mindful of the fact that it would probably be operating in a relatively hostile atmosphere, the Steelworkers Union began many months ago to advertise in leading newspapers and to run so-called "open meetings" on the air. In view of recent revelations of limited enthusiasm on the part of the membership for a steel strike, a fact which must have been known to the leadership for some time, this propaganda was probably aimed as much at the steel workers as at the general public.

The steel companies replied with their own newspaper advertising program. They also put innumerable pieces of literature into the mails, addressed particularly to so-called opinion makers. These opposing publicity programs probably offset each other. It is unlikely that either side made any large number of converts.

Once the bargaining was under way, it became clear that the union had no very specific demands in mind comparable to some issues in previous negotiations. Immediately after World War II, a sizable increase in hourly wages was its clear cut and firmly articulated objective. At a somewhat later point, pensions and health and welfare benefits played the same role. More recently, it was supplementary unemployment benefits.

But this year, union spokesmen seem to have run out of new ideas, at least temporarily. They are asking for more and they seem to be willing to take it almost anywhere. They are really saying that they want a share of the prosperity which they believe the steel industry is enjoying.

Industry leaders, on the other hand, are saying very forthrightly that the present prosperity is not of great magnitude and that, in any event, they would prefer not to share it. To be sure, there is much rationalization about the need for avoiding inflation; but for an industry which has shown so little regard for this matter in the past, this argument has a rather hollow ring.

Despite the Federal Government's general avowal that it will stay out of labor-management affairs, it has found in this case, as in the past, that in a negotiation of such critical importance, government can not remain aloof. Accordingly, just about the time the negotiations got underway, the President injected the Federal Government's influence by publicly warning the two sides against making a settlement which would again trigger a wage-price spiral.

It is really this potential in the steel negotiations which gives them so much significance. For example, when Senator Estes Kefauver suggested that wage increases be limited to gains in productivity, he was chastised by David J. McDonald, president of the Steelworkers. But the senator, no enemy of organized labor, retorted, "The price of steel is not just McDonald's business nor just the business of Roger Blough, chairman of the board of U. S. Steel; it is the business of all the people."

When an industry is so affected with a public interest as to be "the business of all the people," it assumes almost—if not entirely—the position of a public utility. As such, it can be expected to be regulated to some degree. Not for many years has there been so much discussion as now about the possibility of the Federal Government stepping in and regulating not only prices but also wages in the basic steel industry.

The O'Mahoney bill, which would require dominant corporations in certain heavily concentrated industries to give advance notice of price changes, is already in the legislative machinery and it could be brought forward for passage at any time. If this bill were to become law, the Federal Trade Commission and the Attorney General could require a company to justify its price action at a public hearing and to produce all its books and records which the government might wish to see. Witnesses for and against the price increase could be called to testify.

Although the company could put the price increase into effect at the end of 30 days, this possibility of being required to "undress in public," to place on public view their normally confidential books and records, would certainly limit their freedom. And this is exactly the end that such legislation would be designed to accomplish.

Certainly no price control legislation would finally be enacted without accompanying wage controls. Perhaps the opposition of both labor and management would be sufficient to kill any legislation. But if every steel wage change can be expected to bring a price rise which then develops into a wage-price spiral throughout the economy, some restrictive legislation aimed directly at

(Continued on page 65)

CHANNEL CONSTRUCTORS • AGGREGATE PLANT • NIAGARA POWER PROJECT

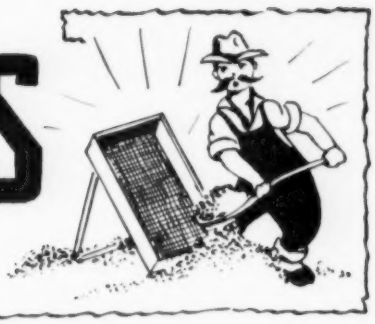
Here it is—the world's largest aggregate plant. To see it, to inspect it and to know the magnitude of its function is to understand a new criterion of functional and design excellence in industrial engineering.

Consultant engineering, design and construction of facilities for aggregate, commercial and chemical stone, cement, lime, lightweight and slag—upgrading of aggregate and sand—beneficiation. This is **MEISSNER** *engineering.*

mei

MEISSNER ENGINEERS INC., 300 WEST WASHINGTON, CHICAGO 6

SCREENINGS



By RAY L. SMITH JR.

THE UNFORGIVABLE sales letter asks you to believe facts which are not true. It may be premeditated deceit, as in the form letter we received recently where we are told "You have been selected as an outstanding leader in your city," or some such hogwash; or just gross exaggeration in an attempt to sweep the reader off his feet. The latter type is especially offensive. The same is true of another example where our name was poorly typed at the top with no mention of title. Thus, the letter classified itself as a form presentation which obviously went to many other "prospects." It must have landed in an equal number of wastepaper baskets.

The object of the letter was to arouse interest in a publicity service, which may be good enough, but it certainly gets a black eye from the manner in which it is offered. When you contemplate the size and standing of this famous corporation, you realize how far the letter misses any chance of getting a reply. Even our pencil will cringe a little as we write the following quotations:

"We sway millions of people to your product . . . by ingeniously devising . . . stories about your company . . . aimed at eliminating hostile attitudes and misinformation."

"Your success is assured overnight." (A ridiculous statement to any company)

"You must 'see to believe' my extraordinary . . . methods guaranteed to hypo sales whether your company is big or small." (The "whether" is absurd—"extraordinary" is a carnival barker's word.)

Enthusiasm in presenting a product or service is a fine and necessary attribute. But there is a limit to the size of the bite one can expect the reader to swallow. Beware of glittering generalities offered without proof. Beware of overpadded words which smack of high pressure. The best sales letters are well grounded in facts, intense but not wild in tone. Let sincerity be the bedrock of your approach.

Night and Day

WE ARE advised that Robert W. (Screamin') Beeman, a gravel pit operator in Anderson, Ind., has laid down some ground rules, governing the use of his driveway as a lover's lane. Seems Mr. Beeman ran an advertisement in the local newspaper and made it known that he was not averse to moonlight operations. "Participants park on the right, spectators on the left," he ruled. "During the daylight hours, please cover windows, as we have had several near collisions because of truck drivers not watching the road!"

We are most beguiled by a question which "Screamin' " leaves unanswered. What the dickens are the spectators there for anyway? Don't tell us, now! We want to work it out for ourselves.

It's none of our business, of course, Mr. Beeman, but we think you ought to set up a bumper-sticker advertising program built around the slogan, "Come To Beeman's—Day and Night Shifts!" You might even sell a little gravel with that program. Wonder if this constitutes an unfair trade practice?

Betcha that's where "Barbara"—Greene and "Alice"—Chalmers hang out.

Potpourri and Succotash

There was a young woman who had so many children that she didn't know what to do, and another coming; so she went to the doctor and said, "Doctor, I keep having children; I don't know what on earth to do." He studied her a moment and then said, "You must take three aspirins." And she said, "When, before or after?" And he said, "Instead."

"Everybody all set back there?" called the bus driver.

"Wait just a minute," a girl's voice said, "until I get my clothes off."

Every head in the bus swung around—to see a girl step off the bus carrying two packages of laundry.

Television isn't all entertainment—it has its practical side, too. Take the case of a night worker who came home one morning hungry for his regular large breakfast.

He found eggs, flour, butter, and other ingredients spread out on a table placed directly in front of the TV set. Popped up against the mixing bowl was a note.

"Henry," it said, "I have gone shopping. The recipe for your breakfast will be demonstrated on Channel 12 at nine o'clock.

"My one ambition," said the boss sourly, "is to be able to look my secretary in the eye and know I'm earning as much take home pay as she is!"

At a party one night, Oscar Levant, the composer and pianist, who is not an even-tempered person at best, was being annoyed by a woman who chattered constantly during his playing.

When he finished, she rushed over to him enthusiastically. "Oh, Mr. Levant," she gushed, "that was perfectly lovely! Do tell me something about yourself. Why did you take up the piano?"

"Because," said Levant sourly, "my beer glass kept falling off the violin!"

An irate lawyer, trying to establish a point of cross-examination, demanded of the defendant: "Madam, while you were taking your dog for a walk, did you stop anywhere?"

"Sir," the witness said quietly, "have you ever taken a dog for a walk?"

Choose from

Trailmobile's 4 basic dump trailers

and enjoy an unlimited range of options

to meet your particular requirements.

No single type of dump trailer can possibly meet the diverse requirements of construction work today. And that's why Trailmobile offers four basic dump trailers, all available in aluminum or steel, plus an unlimited variety of optional custom features.

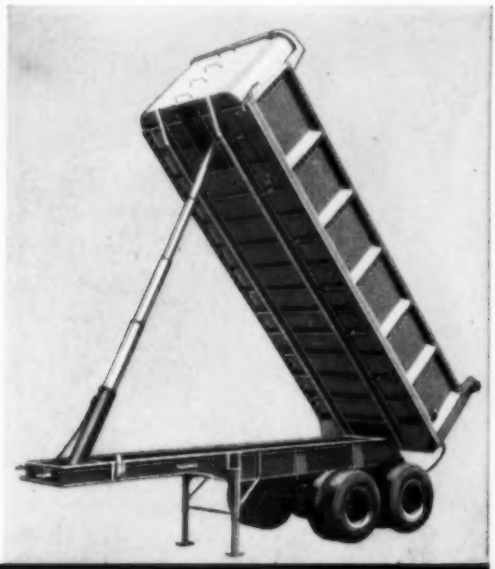
Only by picking and choosing from a wide selection of body sizes, hoist arrangements and chassis construction can you obtain a dump trailer that exactly meets your specific requirements without undesirable compromises. And, only Trailmobile offers you so many "custom-design" opportunities. For more information, mail coupon now.

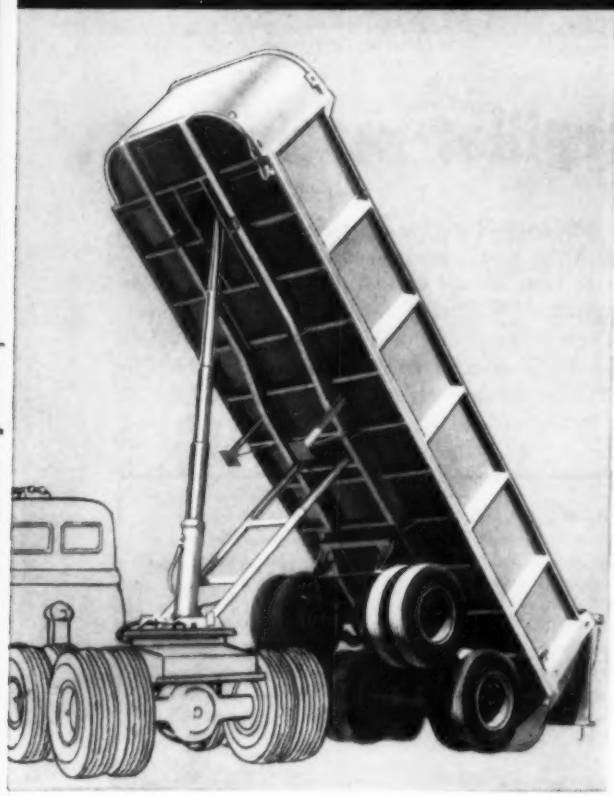
Twin Piston Underbody

Frameless Telescopic

Twin Telescopic Underbody

Front Mount Telescopic (Single or Twin)





TRAILMOBILE INC

Cincinnati 9, Ohio • Springfield, Mo. • Longview, Texas • Berkeley 10, Calif.

Trailmobile Inc. • 31st and Robertson • Cincinnati 9, Ohio

Please send me the new 8-page booklet on Trailmobile Dump Trailers.

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company

address

city state

TR-819

New pit...new Caterpillar machines...

Alexco Aggregates Inc. completely equipped their new Glen Lake, Minn., operation with Caterpillar machines. This includes two Cat Diesel Engines to operate crusher and shaker, two Cat Electric Sets to supply power for the conveyor system. The pit supplies road materials ranging in size from 1½" crushed rock to ¾" asphalt aggregates.

A Cat No. 977 Traxcavator with side dump bucket loads in excess of 3,000 tons per 10-hour day—stockpiles too.

"This machine is ideal for our pit," says Superintendent Bill Grimme. "It's fast, increases production, and is easy on the operator."

Look at these features that pay off in more speed and volume for bigger profits:

Reduced Cycle Time—Less Loading Area—turning to load is unnecessary with the exclusive 2¼-yd. side dump bucket. Maneuvering is confined to forward-reverse movement.

Top Efficiency—Less Load Time—operator has good visibility to cast material accurately and with little spillage. Lift, tilt and dump levers are located for one-hand control. With float and lock-out mechanism, operator can release levers while bucket is in motion. An automatic positioner returns the bucket to desired digging angle. And the bucket can be tilted backward a full 40° at ground level to pry a full load on every pass.

NOW . . . A TOUGHER NO. 977 SERIES D: new track links for greater strength and longer wear; hydraulic track adjusters, already standard on the Series E, now available for the Series D.

FOR THE SERIES E MODEL: new lifetime lubricated rollers and idlers that need no servicing until rebuilding. New triple grouser track shoes, for added traction in soft materials, have low turning resistance and longer wear. The No. 977A Bulldozer has new durability . . . offers added versatility to the No. 977 Traxcavator.

top production from the start

Two D8s with "U" blades make every pass pay off... stockpiling and 'dozing material into crusher hopper.

With the No. 8U Bulldozer you get the shearing action of an angling blade . . . plus the rolling action of a straight blade. Material is forced to the center of the blade where a capacity load is carried the full length of the pass. Spillage over the top or out the sides is reduced. Tests show that 'dozing production is *increased up to 50%* when you replace a conventional blade with a Caterpillar "U" blade.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BORN OF RESEARCH
PROVED IN THE FIELD

THERE'S A NEW D8...
THE SERIES H

. . . with more horsepower, new features to move materials faster and easier than before. Horsepower is up to 225 at the flywheel, 180 at the drawbar. Lugging ability is increased by ⅓.

SIZE INCREASED 4,100 LB.—gauge also increased to 84"; track on ground length to 114"; square inches of contact increased to 5,050.

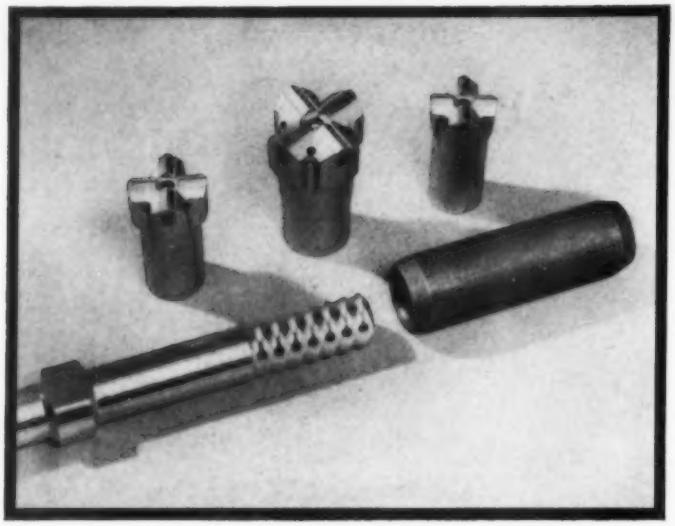
LIFETIME LUBRICATED ROLLERS AND IDLERS — no service necessary until rebuilding.

DRY-TYPE AIR CLEANER—removes at least 99.8% of dirt in the intake air. Can be serviced in 5 minutes and the element re-used.

Other improvements include stronger, heavier undercarriage; superior operation; high speeds.

Get high production in your pit or quarry by standardizing on Caterpillar machines. They make the hard work look easy. Call your Caterpillar Dealer soon. He's ready to give you a demonstration on your job, under your conditions.

Enter 18 on card, page 155



Here's proof Coromant rope-thread bits and steels SAVE TIME AND MONEY

"Up to double the footage between sharpenings!"
"Premature rod breakage is almost non-existent!"
"40% more usable life—more resharpenings!"
"Bit and rod life are well above average!"
"Uncouple by hand all the time!"
*"More rigid—drills straighter holes!"**

**Names of men quoted available on request*

The comments above are actual quotes from project managers, job superintendents, and drill superintendents who have tested new Coromant rope-thread bits and steels. They've learned, on-the-job, the benefits they—and you—can expect!

For example: The new rope-thread (only two turns per inch) holds tight in use, yet permits hand uncoupling. Reports show that the time saved results in more footage drilled per shift. Bit footage is well above average too, with less loss of carbide inserts. Prime quality ore plus nickel-chrome alloy permits cold-rolling from billets for greater strength, life and rigidity. And only with Coromant rope-thread steels can you re-thread without heat treating, too. Do it yourself, or at any nearby machine shop.

Want to know more? There's no obligation on your part, but we'll be glad to help where we can. Just call your nearest Atlas Copco Office, or write to us at Dept. PQ-7.

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Only BAGPAKS® have a built-in insurance policy backed by International Paper

ACCIDENTS like this *will* happen. That's why International Paper plans for extraordinary stresses and strains when designing its Bagpak multiwall bags.

Only genuine *Gator Hide*® kraft, famous for toughness, is ever used in making Bagpak multiwalls. Quality is controlled every step of the way. International Paper can do this because it grows its own trees, makes its own paper, converts it into printed multiwall bags to your order. It also designs and builds *Bagpaker*® machines that can package up to 60 tons of material per hour!

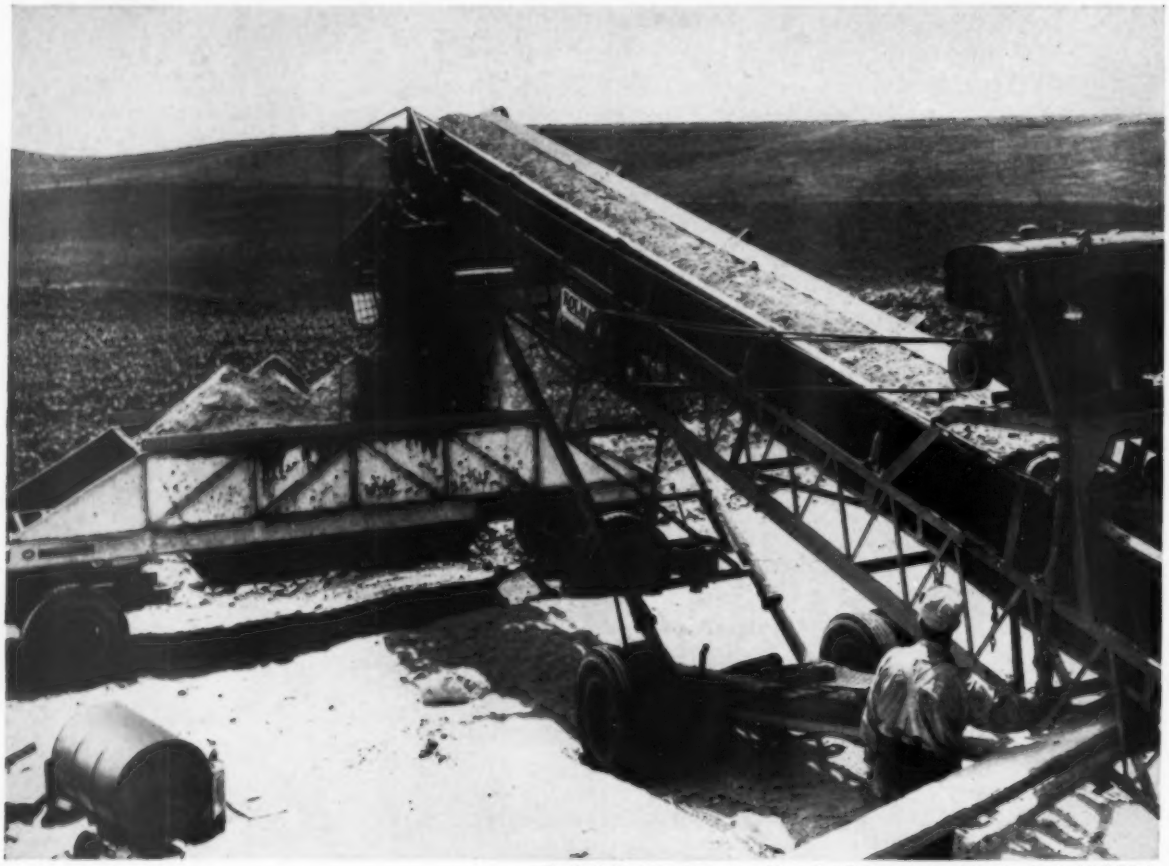
When you buy Bagpak multiwall bags you get speedy shipments geared to your production schedules. *Twenty-one* sales offices and four strategically-located plants save you money by keeping your inventory at a minimum.

Only Bagpak multiwalls are backed by the full resources of International Paper—world's foremost pulp, paper and paperboard producer.

Next time your Bagpak field service engineer drops by, ask him what's new. He knows.

Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.

US RUBBER CONVEYOR BELTS



Stockpiled aggregates at crushing plant being conveyed into trucks via "U.S." Belt.

"No maintenance, no repairs, no downtime,"

SAYS CO-OWNER OF BIG CRUSHING PLANT

Mr. John Weelborg (of Weelborg Bros., Dell Rapids, S. D.) is co-owner of a firm engaged in crushing aggregates and in chip-surfacing roads.

The rock (dug from nearby pit) is bulldozed into stockpiles. 5-ply belts in widths of 36", 30", 24", 20" then carry the rock to the crusher for processing. These same belts carry crushed rock and sand to trucks for transportation to road-building sites.

"In the 20 months since these belts were installed," says Mr. Weelborg, "there has been no maintenance, no repairs, no downtime. *We couldn't ask for better belts.*"

• • •

When you think of rubber, think of your "U. S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.

This installation was handled by "U. S." Distributor W. S. Nott, Minneapolis

US RUBBER

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

News of the Industry

Hudson Cement Corp. To Expand Cement Output To 2,000,000 Bbl. Yearly

Extensive expansion of the Hudson Cement Corporation's cement plant near Kingston, N. Y., is scheduled for completion early in 1960. Capacity of the facility will be more than doubled.

Construction costs were not disclosed, but the first unit of the plant was completed last year at a reported cost of $3,500,000. Present output of 900,000 bbl. of cement a year will be increased to 2,000,000 bbl. when the expansion is completed next March.

Hudson is a subsidiary of the Colonial Sand and Stone Company.

Elect W. C. Russell President Of American Cement Corp.

At the recent organization meeting of the board of American Cement Corporation, directors elected Walter C. Russell president of the corporation.

Mr. Russell, who is also vice-chairman of the board and chairman of the executive committee, succeeds D. S. MacBride, who died last March.

W. C. Russell

Mr. Russell was president of Peerless Cement Corporation prior to its merger on December 31, 1957, with Riverside Cement Company and Hercules Cement Corporation to form American Cement Corporation. He has been with Peerless since 1933 as its chief executive officer.

Net sales in 1958 for Lone Star Cement Corporation increased approximately five percent to a new high of $99,788,259, compared with $95,211,933 for the previous year. Net operating earnings rose to $16,021,420 from 1957's $15,702,778.

Sales of $101,433,063 in 1958 exceeded the hundred million mark for the first time in Vulcan Materials Company history. This figure shows an increase of 15 per cent over 1957.

New Finish Mill Scheduled For Louisville Cement Plant In $1,000,000 Expansion

A $1,000,000 expansion program has been scheduled for the Louisville Cement Company plant at Speed, Ind. Construction of a new portland cement finishing mill, a part of the expansion, is expected to begin late in August.

Work is nearing completion on 12 new cement storage silos at Speed. The cost of the erection is reportedly $2,000,000. Last year a kiln costing $1,500,000 was installed at the same plant.

The 42nd annual meeting of the National Slag Association will be held October 29-30 at Boca Ratan, Fla. Hotel arrangements for the meeting have been made with the Boca Ratan Hotel and Club.

Coming Events

June 17-20, 1959 — New York. Mid-year meeting, Expanded Clay and Shale Association. Hotel Commodore.

June 21-26, 1959—Atlantic City. Annual meeting, American Society for Testing Materials. Chalfonte-Haddon Hall.

July 8, 1959—Hot Springs, Va. Directors meeting, National Crushed Stone Association. The Homestead.

July 19-22, 1959—White Sulphur Springs, W. Va. National Bituminous Concrete Association. The Greenbrier.

September 14-17, 1959—Denver. Metal-mining industrial minerals convention, American Mining Congress.

September 27-30, 1959 — Lake Placid. Semi-annual meeting, board of directors, National Sand and Gravel Association. Lake Placid Club.

October 1-3, 1959—Philadelphia. Operating meeting, National Lime Association. Sheraton Hotel.

October 11-16, 1959—San Francisco. Third Pacific Area national meeting, American Society for Testing Materials.

October 29-30, 1959 — Boca Ratan, Fla. 42nd annual meeting, National Slag Association. Boca Ratan Hotel and Club.

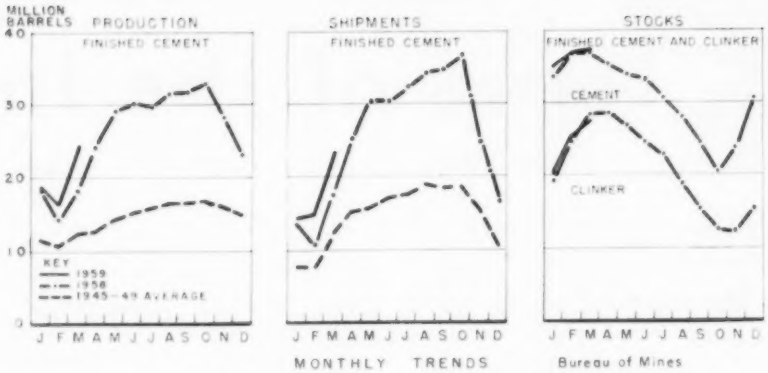
April Seasonal Expansion Ups Construction Activity To New $4 Billion High

New construction activity expanded seasonally in April and brought the total value of work put in place to new highs of $4,200,000,000 for the month, and $15,100,000,000 for the January-April period, according to preliminary estimates prepared jointly by the U. S. Departments of Labor and Commerce.

This year's April figure was up 15 percent from 1958, and the total for the first four months was 13 percent higher. Spending for new construction thus far in 1959 was at a seasonally adjusted annual rate of $54,-300,000,000, compared with actual outlays of $49,000,000,000 for the entire year 1958.

Private expenditures for new construction in the January-April, 1959, period reached a record $10,700,-000,000, mainly because of the 29 percent advance in residential building (to $6,100,000,000) over the early months of 1958.

Public construction expenditures through the end of April, 1959, at $4,400,000,000, were 17 percent above the first four months in 1958. The gain came chiefly from expanded activity in highways, housing, and military construction.



SUMMARY — Production of finished portland cement in March, 1959, as reported to the U. S. Bureau of Mines, totalled 24,329,000 bbl., an increase of 35 percent over March, 1958. Mill shipments in March, 1959, totalled 23,011,000 bbl., an increase of 32 percent over March, 1958. Stocks of 37,759,000 bbl. of finished portland cement on hand March 31, 1959, were 3 percent more than those on hand March 31, 1958. Clinker production during March, 1959, totalled 26,968,000 bbl., an increase of 23 percent over the March, 1958, figure.

PRODUCTION — One hundred and sixty-five (165) plants in 37 states and Puerto Rico reported a production of 24,329,000 bbl. of finished portland cement during March, 1959, compared with 18,038,000 bbl. produced in March, 1958.

Production of clinker during the month of March, 1959, was 26,968,000 bbl. compared with 21,853,000 bbl. during the same month last year.

High-early-strength portland cement in March, 1959, totalled 1,001,000 bbl., an increase of 20 percent over the March, 1959, production.

Prepared masonry cement production in March 1959 of 1,281,000 bbl. increased

SHIPMENTS — Mill shipments of finished portland for March, 1959, totalled 23,011,000 bbl. compared to 17,486,000 bbl. in March, 1958.

In March, 1959, shipments were higher in twenty (20) districts and lower in three (3) districts than in March, 1958. The greatest increases were in the Western Missouri-Nebraska-Oklahoma-Arkansas, eastern Missouri-Minnesota-South Dakota, and Kansas districts. The greatest decrease was in the Illinois district.

Mill shipments of the high-early-strength portland cement totalled 1,111,000 bbl. in March, 1959, a 22 percent increase over the 913,000 shipped in March, 1958.

Mill shipments of prepared masonry cement in March, 1959, totalled 1,302,000 bbl., an increase of 23 percent over the 1,061,000 bbl. shipped in March, 1958. Nearly one-half of these shipments were from mills in the northern states east of the Mississippi River. Prepared masonry cements are shown in 376-pound barrels although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 37,759,000 bbl. of finished portland cement were on hand March 31, 1959, an increase of 3 percent over the 36,734,000 bbl. on hand March 31, 1958. Stocks of clinker on hand March 31, 1959 totalled 27,617,000 bbl., a decrease of 2 percent from the 28,235,000 bbl. on hand March 31, 1958.

FIRST THREE MONTHS OF 1959 — For the January to March period of 1959, the volume of production of finished cement amounted to 59,643,000 bbl., compared with 50,393,000 bbl. in the same period of 1958. Total shipments for the first three months of 1959 are reported as 52,212,000 bbl.; in 1958 (January to March period) the total shipments were 41,933,000 bbl.

Canadian Gypsum Company Ltd. Starts Expansion Project

Construction has been started on a multimillion-dollar expansion project at the Canadian Gypsum Company, Limited plant at Hagersville, Ontario, to double its capacity.

Although this plant has been runing at full capacity, growing demand has necessitated the construction of duplicate production facilities.

When completed, the Hagersville plant's capacity will be sufficient to provide gypsum and plaster products for the construction of 50,000 houses

Open Market Lime Sales Show Increase for February

Domestic sales of open-market lime in February (713,493 short tons) increased from the previous month's output, according to reports by producers to the U. S. Bureau of Mines. Increases were noted in agricultural, construction and refractory lime, whereas a slight decrease was noted in chemical and other industrial lime.

Lime Sold by Producers[1] in the United States, in Specified Periods of 1958-59, by Types and Major Uses in Short Tons

	January 1959	February 1959	February 1958	January-February 1959	January-February 1958
By types:					
Quicklime	569,923	575,161	434,232	1,145,084	920,000
Hydrated lime	132,660	138,332	111,815	270,992	256,080
Total	702,583	713,493	546,047	1,416,076	1,176,080
By uses:					
Agricultural:					
Quicklime	3,059	3,045	2,357	6,104	4,359
Hydrated lime	4,146	7,427	4,842	11,573	10,109
Total	7,205	10,472	,7199	17,677	14,468
Construction:					
Quicklime	11,479	10,494	6,691	21,973	17,562
Hydrated lime	56,533	58,797	46,525	115,330	119,512
Total	68,012	69,291	53,216	137,303	137,074
Chemical and other industrial:					
Quicklime	366,483	363,335	308,549	729,818	650,886
Hydrated lime	71,981	72,108	60,448	144,089	126,459
Total	438,464	435,443	368,997	873,907	777,345
Refractory (dead-burned dolomite)	188,902	198,287	116,635	387,189	247,193

[1]Also includes a small quantity of captive tonnage. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

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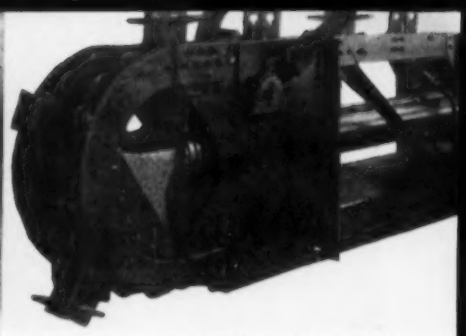

Cutter bars on the traveling chain of the "Swintek" actually carry nozzle clogging oversize material up the ladder and dump them away from the suction zone.

Eagle Revolving Cutter Head Dredging Ladders recommended for dredging in hard or sticky material which does not cave or disintegrate freely. Ask for Bulletin 156. Eagle also builds complete All-Steel dredges.

users report

BIG INCREASE

in production with an Eagle "Swintek" Dredging Ladder!

A New Jersey operator even reported as much as 400% increase in output—A Kansas producer with three "Swintek" equipped dredges as much as 300%. No producer that has installed an Eagle "Swintek" ever failed to achieve a worthwhile increase in production—much more than enough to justify the cost. The traveling chain of the "Swintek" screens the intake nozzle keeping out boulders and logs—eliminates shut-downs because of clogged lines—protects pump. Cutter bars on the traveling chain agitate the deposit greatly increasing intake of solids—also cut through stratas of clay that ordinary suction cannot penetrate—promotes continual bank caving, relieving dangerous problem of deep under cutting. A size and type for every condition—river or pond dredging. When your pit gets below the water table and you convert to pumping keep the "Swintek" in mind. *Send for Catalog 83.*

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EIW

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EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

133 Holcomb Ave., Des Moines, Iowa

State Highway Projects Highlighted in Convention of Texas Associations

Members of the Texas Aggregates Association and the Texas Ready Mixed Concrete Association met in their fifth annual joint convention on April 23-25 at the Shamrock Hilton Hotel, Houston, Tex. Highlights of the program involved talks on the state road program.

L. Ed Lee

Dewitt Greer, state highway engineer, noted that the Texas highway department is currently spending about $142,000,000 annually for road materials—about three times as much as expenditures five years ago. Significantly, 4,200 miles have been added to the state highway system since that time. Finances permitting, the highway department will spend $190,000,000 in the next 12 months for concrete and aggregates—a figure that represents about 54 percent of total contract costs.

Other speakers on the three-day program included Joseph E. Gray, engineering director, National Crushed Stone Association; H. C. Pfannkuche, structural engineer, Portland Cement Association; W. B. Mansfield, Texas engineering extension service, Texas A & M College; and Dr. James A. Byrd, economic adviser, National Bank of Commerce, Houston.

Officers of T.A.A. are L. Ed Lee, president; Robert G. Pyle, vice-president; and R. E. James Jr., secretary-treasurer. Top officers of T.R.M.C.A. are Rai B. Kelso, president; W. B. Dement, vice-president; and Clyde McMahon, second vice-president. Ray L. Cain is executive secretary of the two associations.

Calaveras Cement Earnings Up Sharply in First Quarter

Net earnings of Calaveras Cement Company for the first three months of 1959 totaled $317,980 against $5,087 for the corresponding period of last year. On a basis of 450,029 shares outstanding, the earnings were equivalent to 71 cents for the first quarter of this year, against one cent for the first quarter of 1958. Unfavorable weather was cited for the poor showing last year.

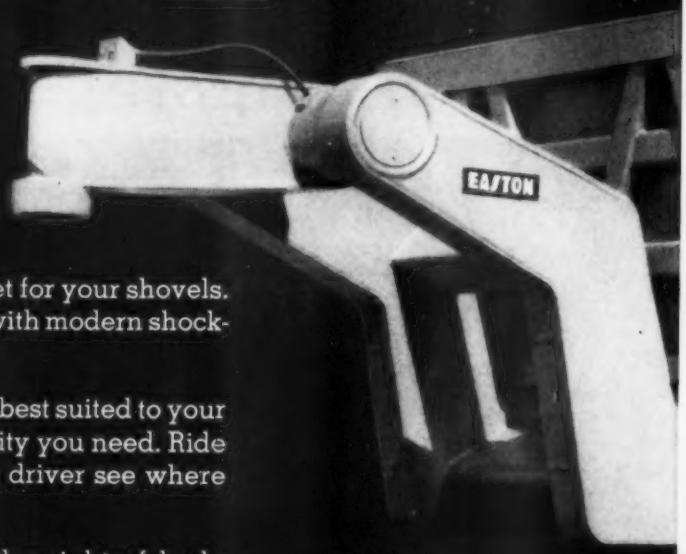
The company's wholly-owned subsidiary, Stockton Building Materials Company, is building a new ready-mix plant at Lathrop, Calif., and the merger of five Central Valley building materials and sand and gravel companies in which Calaveras owns 52 percent interest were recently completed.

FOR MODERN HAULING!

See the only complete line

EASTON PAN-TYPE SIDE-DUMP
TRUCK BODIES · TRAILERS · TRAINS

Distributed by Truck Manufacturing Companies and their Local Dealers



BEST LOADING! Get the big, easy target for your shovels. Stop spillage. Get body strength built with modern shock-and-abrasion-resistant alloy steels.

BEST HAULING! Choose the *power unit* best suited to your work. Get the speed, power and capacity you need. Ride a straight-on side-dump loop. Let your driver see where he's going at all times!

BEST DUMPING! Don't carry the dead weight of body hoists. Dump with the EASTON automatic electric overhead hoist. Get stop-and-feed dumping, controlled from a push-button station with a full view of the crusher!

TRUCK BODIES
14, 17, 20, 36 tons

STRAIGHT FRAME TRAILERS
14, 17 and 20 tons

B-1083

9 Executive Appointments Follow Reorganization Of Huron Portland Cement

A general reorganization of management personnel has been effected at the Huron Portland Cement Company following the recent acquisition of the firm by the National Gypsum Company.

Paul H. Townsend continues as president and chief executive officer; he will also serve as chairman of the board of directors. Also elected to the new Huron board of directors were: H. Ripley Schemm, who becomes executive vice-president; Clarence L. Laude, vice-president in charge of sales; Earl W. Denby, who was also named secretary and treasurer; and William M. North, who is also vice-president in charge of expansion of National Gypsum.

Charles M. Adams, assistant manager of the operations department of Huron Portland Cement Company, was named vice-president in charge of operations.

D. B. Littlewood and John D. Gillis were named assistant secretaries, and James P. Dane was named assistant treasurer.

P. H. Townsend

H. R. Schemm

C. L. Laude

E. W. Denby

W. M. North

C. M. Adams

Mr. Townsend joined the firm in 1919. In 1942 he became vice-president with general supervision of manufacturing, sales, and accounting and in 1944 was elected to the board. He became president in 1953.

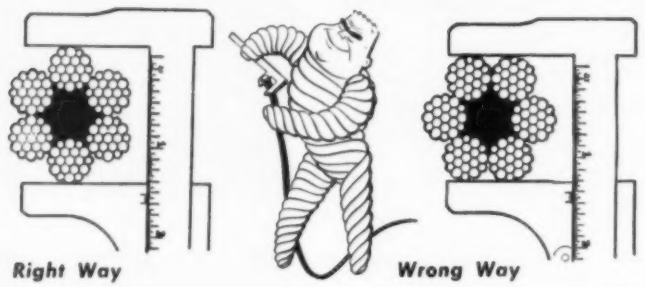
Mr. Schemm joined Huron in 1925. He was named assistant general-manager in 1942, appointed vice president, operations, in '49 and elected to the post in 1953.

Enter 26 on card, page 155

Tuffy® Wire Rope Tips

When Sheaves, Sockets and Clips Misfit... Your Pocketbook Will Be Hard Hit

How to Measure Rope Diameter



To get the most service, efficiency and safety out of wire rope operation, rope and sheaves must be precisely fitted to each other. There's only one right way to measure rope diameter: use machinist's calipers and be sure to measure the **widest diameter.**

A slight shift of the rope in the calipers, as shown above, will give you a misreading which would result in ordering an undersize rope. Note that the measurement at right shows ⅛" under correct diameter. Be sure to double-check every time!

Tuffy Balanced Dragline Rope

Here's highest abrasive resistance with super flexibility. Better spooling. Smoother riding on grooves. And Tuffy Dragline Rope hugs the drum when casting for full load. Gives you longer service life, consistent dependability, in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.

How to Check Groove Diameter

No Go

Just Go

Groove diameter of a sheave or drum must never be less than the actual calipered diameter of the new rope. When a new rope is installed on old equipment, use a reliable groove gauge to make sure the tread or bearing surface of all sheaves is of sufficient size to avoid pinching the rope.

Kick Out Worn Sheaves

Old sheaves may never die, but in "fading away" they develop conditions which shorten rope life. Sheaves with grooves corrugated with rope lay impressions should be replaced with new ones before new wire rope is installed.

How to Measure Tread Diameter

Easy, and important. Select the smallest sheave or drum to be used with the new wire rope, and measure actual diameter at lateral center (shortest dimension) of tread.

Tuffy Balanced Slings & Hoist Lines

"Balanced" because they combine strength, flexibility and toughness in the proper relationship to do a better job longer.

Tuffy Slings and Hoist Lines are a top-performing team in every type of materials handling. The slings are made of a patented, machine-braided fabric that's next to impossible to knot or kink. The hoist lines are a special construction in which strength, flexibility and toughness are balanced.

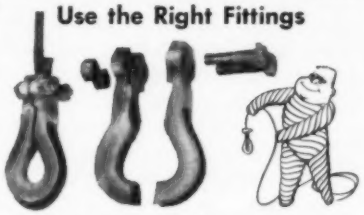
Tuffy Balanced Scraper Rope

"Balanced" construction makes it flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Also gives higher resistance to the shock of load impact on slack line. Moves more yardage per foot because it's specially built to take the beating of drum-crushing abuse.

Tuffy Balanced Dozer Rope

Built to give you longer service with less downtime. Mounted on your dozer, a 150' reel of ½" or 9/16" can give you a big bonus of extra service. Here's how: when rope shows drum wear or is crushed on the drum, you feed through just enough to replace the damaged part. You save the 40 to 50 feet ordinarily thrown away. Also available in 300' and 500' reels.

Use the Right Fittings



Right fittings add life expectancy to wire rope. Fittings which derive holding power from crimping action are harmful.

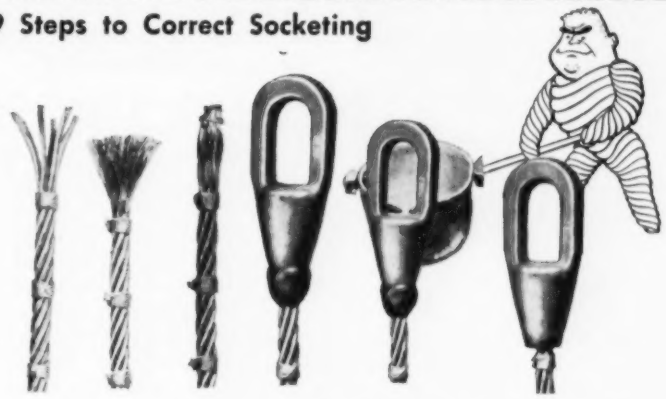
Shown here is a clamp that has no "wrong side"—can be put on either way. It snugly saddles the rope, grips larger surface area in such a way that loads are carried almost entirely by friction instead of crimping action. Combined in its two parts is a thimble. The parts are interlocked to prevent collapse of the thimble and eliminate all shear on the bolts.

Recommended sizes:

Diameter of Rope	Min. Dia.	Max. Dia.
¼-⅞	+ 1/64"	+ 3/32"
⅜-¾	+ 1/32"	+ 1/16"
⅞-1⅛	+ 3/64"	+ 3/32"
1¼-1½	+ 1/16"	+ ⅛"
1⅝-2¼	+ 3/32"	+ 1/16"
2⅜ and larger	+ ⅛"	+ ¼"

New ropes are usually over-size. It is advisable to have groove diameters of sheaves or drums as large as the actual calipered diameter of the new rope, or slightly larger. We recommend sizes as above charted.

9 Steps to Correct Socketing



1. Securely seize and serve with soft wire ties before cutting, and have at least two additional seizings placed at a distance from the end equal to the length of the basket of the socket.

2. When the rope is properly seized, take off the end seizing. Cut the fiber center back to the seizing, as shown in 1 above. Untwist and broom out the wires. See illustration 2.

3. Clean the wires for the distance they are to be inserted in the socket. Use benzine, naphtha, gasoline or other solvent. Then wash off in boiling water or boiling ammonium chloride used in Step 5.

4. Then dip cleaned wires in commercial muriatic acid to a depth not greater than ¾ of the cleaned length of wire. Keep the wires immersed for 3 minutes, or until the acid has thoroughly etched each wire. Be sure acid does not contact any other portion of rope.

5. Immerse wires into boiling ammonium chloride. A white coating will be left on the wires.

6. Place a temporary tie wire over the ends of the cleaned wire (see illustration 3). Be careful not to get the cleaned wires greasy or oily.

7. Insert the rope end into bottom of socket. Remove temporary tie wire.

8. Holding the rope vertically in a vise, set the socket so that the wires are flush with top of the socket basket and seal the bottom with putty or clay (See illustration 4). Pour in among the wires about ½ teaspoon of sal ammoniac crystals.

9. Pour molten zinc into the basket until it is full (see illustration 5). When zinc is solidified, the seal is removed and socketing complete as shown in illustration 6. The zinc must not be too hot or it will anneal the wires, particularly of small ropes. Temperature must not be above 925° F. Use pine stick test: if stick chars but does not ignite, the zinc is ready to pour. Overheated zinc will have a red color and stick will catch fire. When zinc has solidified sufficiently, the socket may be plunged into cold water.

FREE!

Complete Splicing and Socketing Manual with engineer's notebook on wire rope constructions and specifications. Write for your copy now. Address Union Wire Rope Corporation, 2132 Manchester Ave., Kansas City 26, Missouri.

Specialists in high carbon wire, wire rope, braided wire fabric, stress-relieved wire and strand.

UNION Wire Rope is Balanced for Greatest Efficiency, Service Life and Safety

Every one of the Tuffy Special Purpose Ropes has a different combination of such properties as strength, toughness and flexibility.

That's because each Tuffy is "job prescribed"—made to perform best under the conditions of its special use.

You hear a lot about extra strength in wire rope. It's no trick to design rope with very high strength. The main thing is to get the proper balance of strength with other qualities needed.

Which is just what you get in every Union Wire Rope product. Why settle for less?

Your Tuffy Distributor Will Help You Get All the Extra Service Life We Build Into Wire Rope

UNION Wire Rope

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2

HEADQUARTERS FOR YOUR BEST BUYS IN USED EQUIPMENT!

Your Caterpillar Dealer's lot holds the best selection of used earthmoving equipment buys on the market. Here's why: His business is active—and he reconditions, classifies and guarantees his trade-ins so you *know* what you're getting. Here's how:

BONDED BUY

1 A **"BONDED BUY"** on used Cat-built equipment is your safest buy. It's a bonded guarantee, up to $10,000 of satisfactory performance on *all* parts during the guarantee period.

2 A **"CERTIFIED BUY"** covers units of any make in good condition. This type of protection carries your dealer's written guarantee of satisfactory performance.

3 A **"BUY AND TRY"** deal is just what its name implies. This protects you with your dealer's written money-back agreement.

Only Caterpillar Dealers offer this protection. You'll find your dealer listed in the Yellow Pages. For your best buys in used equipment, visit his lot today!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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BEST BUYS IN NEW AND USED EQUIPMENT

Enter 30 on card, page 155

Reclaimer Blending System At Phoenix Cement Plant To Boost Uniformity

Construction of Phoenix Cement Company's new 2-kiln plant at Clarkdale, Ariz., is progressing on schedule and was about 80 percent completed as of May 1, 1959.

According to Ray R. Adams, production is scheduled to start some time in August with nearly all of the output initially going to supply the needs of Glen Canyon Dam, the massive Bureau of Reclamation project in northern Arizona. More than 3,000,000 bbl. are involved in the job with deliveries spaced over the next two or three years.

The "reclaimer" raw storage and blending system at Clarkdale is similar to that recently placed in service at the Oro Grande, Calif., plant of Riverside Cement Company. (Both Riverside and Phoenix are divisions of American Cement Company.)

This system is based on storage of the raw materials, after quarrying and crushing, in layers of controlled thickness. An assembly of traveling buckets, operating vertically, cuts a cross-section through the pile to obtain a blend of the desired proportions for delivery to the raw-grinding department. A high uniformity of the finished cement results.

Kiln dust will be filtered through a glass-fiber bag system, and no stacks will be required at the Clarkdale plant.

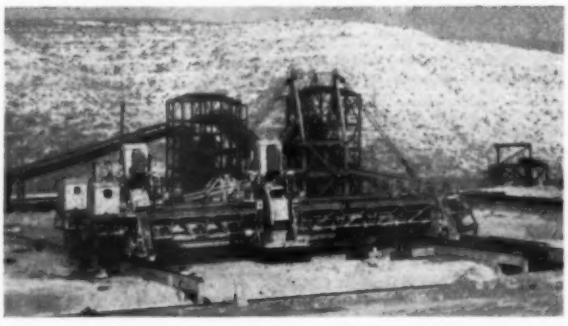
General Portland Cement Co. Starts $17,000,000 Expansion

The board of directors of General Portland Cement Company recently approved an expansion and modernization program for its various plants involving capital expenditures of approximately $17,000,000.

The program includes a project to expand the annual capacity of the Tampa, Florida, plant by approximately 3,000,000 bbl. Included in this new capacity will be facilities for doubling the production of white cement. Work on the Tampa project is to get under way immediately. Present capacity is 4,000,000 bbl.

General operates eight other plants in Florida, Texas, Tennessee, Ohio, Michigan, and Kansas.

This construction view of new Phoenix Cement plant shows mill building (left), and finished cement silos (right). Open tunnel (foreground) holds material conveyor belts.



Wide-track structure (foreground) has scoops that travel back and forth on track while vertically reclaiming properly blended raw mixture.

Enter 31 on card, page 155 →

CATERPILLAR'S PROJECT PAYDIRT

***PROJECT PAYDIRT** pays off for you again*

NEW Caterpillar No. 933 Series F Traxcavator delivers up to 22% more production

The new Caterpillar No. 933 Series F Traxcavator with a larger, 1⅛ cu. yd. bucket is ready now to set new production records. It is the latest achievement of Caterpillar's "Project Paydirt*."

Field tests on a variety of jobs and working conditions proved the new Series F delivers *up to 22 per cent more production* than previous models of this popular machine.

The power source of the new No. 933 is an efficient new 52 HP Cat Diesel Engine. It features a new cylinder block, engine balancer for smooth performance, unit-serviced fuel pump, and a side-mounted starting engine for compactness and economy.

A new transmission and a heavier final drive give the new No. 933 the speed and stamina to maintain quick, easy loading and faster cycling. Cycle time is further shortened by a high-speed reverse—3.67 MPH.

The new machine features greater operator comfort and efficiency. All controls are conveniently visible. Leg room is ample. The mechanical advantage of the steering clutch brakes has been increased 30% for easier operation. A new, larger seat is more comfortable, continues to provide good visibility, both front and back.

And the new No. 933 retains the superior design features that have made Traxcavators first choice on jobs throughout the world. The exclusive oil clutch, automatic bucket controls, 40° tilt-back, heavy-duty undercarriage, unit design and construction — to name just a few. And the exclusive Side Dump Bucket is available to add versatility.

Get the complete story on the new No. 933 from your Caterpillar Dealer. Ask him to demonstrate how this Traxcavator can step up production on your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

HIGHER PRODUCTION and more profits are possible with the new Caterpillar No. 933 Series F Traxcavator featuring a 1⅛ cu. yd. bucket.

* ***PROJECT PAYDIRT:*** Caterpillar's multi-million-dollar research and development program — to meet the continuing challenge of the greatest construction era in history with the most productive earthmoving machines ever developed.

CATERPILLAR

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BORN OF RESEARCH
PROVED IN THE FIELD

First A.I.E.E. Conference On Cement Industry Problems

ALLENTOWN, PA., in the heart of the cement industry, was the scene of the first American Institute of Electrical Engineers conference on the problems of that industry, April 15 and 16 in the Americus Hotel. The A.I.E.E. Cement Industry Sub-Committee of the General Industry Committee and the Lehigh Valley Section of A.I.E.E. co-sponsored the meeting.

One of the features of the two-day gathering was a forum on the present status of automation in the cement industry, with E. A. E. Rich, General Electric Company, Schenectady, as moderator. Panelists and their subjects were as follows: W. F. Henrick, Universal Atlas Cement Co., whose topic was *Sensing Systems for Ball Mill Feeders;* W. McCord, Diamond Power Specialty Corp., who covered *Kiln Burning with Closed Circuit TV;* D. A. Johnson, Riverside Division, American Cement Co., who discussed *Controlling Blending of Raw Materials;* F. J. Anderson, Dragon Cement Co., division of American-Marietta, who spoke on *X-ray Spectograph Chemical Analysis of Raw Materials and Clinker;* and J. A. Allen, St. Lawrence Cement Co., whose paper covered *Use of Gamma Ray in Monitoring Slurry Feed to Kiln — Use of Thermocouples in Measuring Rotating Kiln Temperatures.*

The banquet speaker Tuesday evening, April 15, was C. S. Crawford, president of Whitehall Cement Manufacturing Co.

W. A. Allan, Universal Atlas Cement Co., New York, presided at the general session, which was followed by an electrical power distribution session, which R. P. Scott, Penn-Dixie Cement Corp., moderated. A paper, entitled *Principles of Electric Power Distribution System in Lehigh's Miami Plant,* was given by J. F. Hower, Lehigh Portland Cement Co., and A. C. Lordi, Westinghouse Electric Corp. A second paper, covering *Principles of Electric Power Distribution Systems in Crusher and Quarry Departments,* was presented by S. C. Cooke, General Electric Co., and R. C. White, MacDonald Engineering Co.

In the afternoon the following papers were given in an electric drives session: *Cement Plant Drives,* by W. J. Lefferts, Allis-Chalmers Mfg. Co.; *Selection of Electric Equipment for Ball Mill Drives,* by E. A. E. Rich; *Protection for Motors Driving Ore and Rock Crushers,* by H. A. Wright and T. F. Bellinger, Allis-Chalmers Mfg. Co.; *Selecting Control for Heavy Machinery,* by W. R. Patterson and R. A. Gerg, Allis-Chalmers Mfg. Co.; and *Application of Electric Drives to Cement Kilns,* by A. K. Raney, General Electric Co.

This meeting drew an attendance of over 300 and was so successful that a similar conference will be held in Milwaukee in November, 1960, as a result.

Kaiser Aluminum & Chemical Plans Big Periclase Plant

Refactory magnesia operations of the Kaiser Aluminum and Chemical Corporation will soon be expanded with the addition of a new $3,000,000 periclase plant at Midland, Mich. Construction is expected to be under way soon, and production is scheduled to commence early in 1960 with an initial annual capacity of 45,000 tons of periclase.

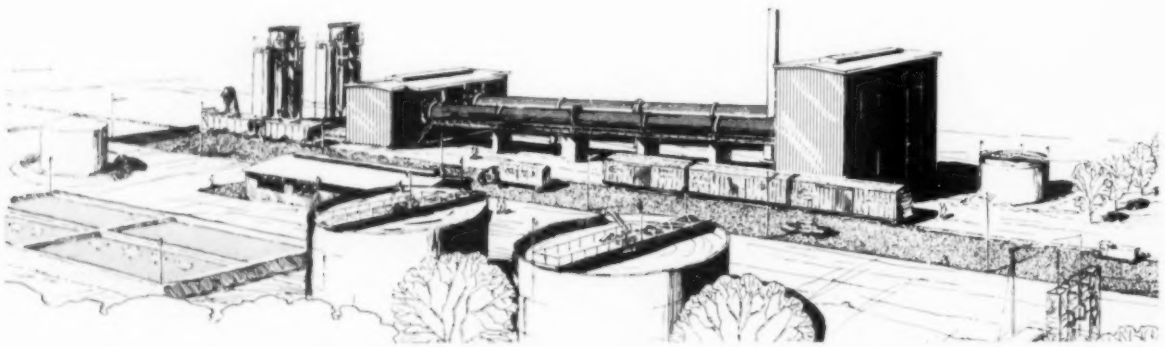
The plant will use magnesium hydroxide supplied by the Dow Chemical Company from that firm's deep-well brine operations at Midland. Hydrate will be pumped in slurry form through about 15,000 ft. of pipe to the new Kaiser plant. There it will be filtered, mixed with small quantities of additives, and sintered in a 275-ft. rotary kiln.

Liquid wastes from the magnesia plant will be disposed of through the new $2,000,000 Dow waste disposal plant.

The new Kaiser facilities will provide raw material for the firm's basic refractories plant at Columbiana, Ohio, which is now being expanded for the second time to meet increased demand.

● Architect's drawing of the new periclase plant to be built at Midland, Mich., for Kaiser Chemicals. Plans call for construction of one rotary kiln initially, with a second to be added at a later date. Process details will parallel those used at the firm's Moss Landing, Calif., seawater magnesia plant.

Purchase of about five acres of land along the Detroit River was recently made by Huron Portland Cement Company, Detroit, Mich. Sale price of the property, formerly owned by the city of Detroit and adjoining Huron's present distributing plant, was $410,000. The land had formerly been leased from the city. The purchase was made to allow for future expansion of Huron's Riopelle, Mich., plant.



Enter 33 on card, page 155 ➔

PARADE OF PROGRESS

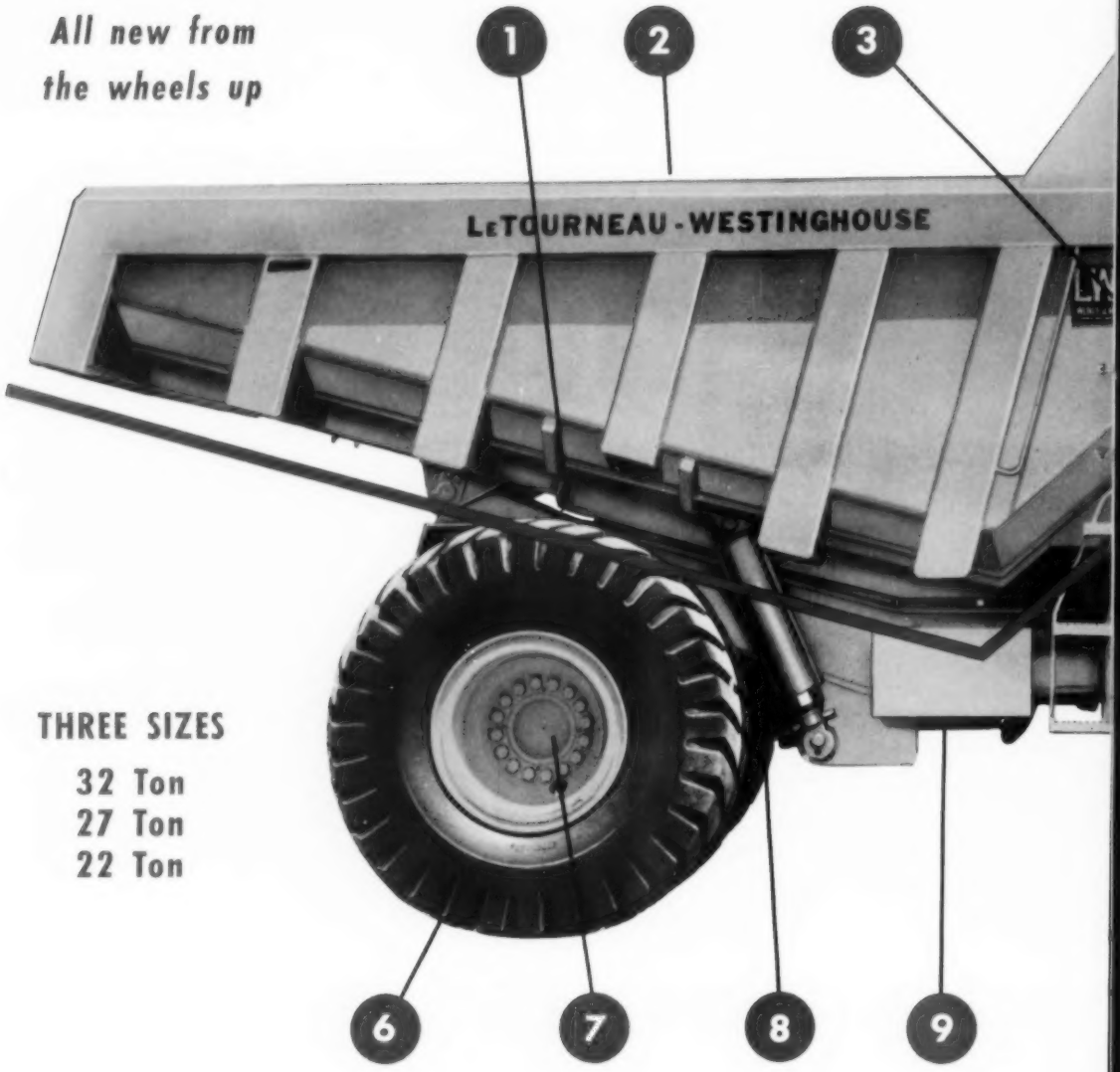
The first all-new off-road truck in a quarter-century...

Haulpak®

A PRODUCT OF LeTOURNEAU-WESTINGHOUSE

Haul more tons per man-hour with

All new from the wheels up



THREE SIZES

32 Ton
27 Ton
22 Ton

Look at these important advanced HAULPAK features...

1. **"V"-shaped body** — gives you bonus yardage within a short wheelbase. Furthermore, with the LW wedge-shaped body, loaded material quickly fills all corners for big low-void payloads. It also provides a low center of gravity . . . gives Haulpak the stability needed for high-speed hauling over rough roads and steep grades.

2. **Low loading height** — (only 10'1" on the 32-ton size) and large top opening (14'5" x 11') makes it easy for shovel operators to load Haulpak fast, without spillage.

3. **Big, roomy cab** — with canted windshield has many work-efficiency features.

4. **Strong, protective canopy** — covers cab completely.

5. **Positive power steer** — and sure-grip, auto-size steering wheel — for safe, easy handling. Steering system is located high behind bumper, protected from damage.

6. **Six big 18.00-25 tires** — for better traction and smooth, cushioned ride.

7. **Exclusive power-transfer differential** — automatically transfers power to wheel on firmest footing for maximum traction. This same, patented LW differential has boosted production and profits for thousands of LW Tournapull® owners for more than 14 years . . . and now, *for the first time, it is available on a truck.*

8. **Fewer moving parts** — between engine and wheels saves power and reduces maintenance costs. Haulpak's final drive has only six gears, compared to the twelve or more found in the normal big trucks.

9. **100% rubber-mounted body** — cushions loading shocks. Engine, transmission, radiator, and cab also rubber-mounted to minimize vibration.

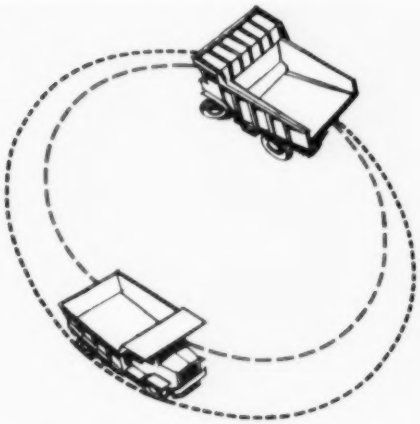
10. **Four separate braking systems** — for fast, safe, sure stops. System includes Torqmatic brake in the Ha'oac : transmission and big, disc-type air brakes on all wheels having four times the braking surface of conventional trucks.

11. **"Power-Miser" fan** — standard on all Haulpaks, requires only 10 hp to operate, compared with the 30 to 35 hp needed for conventional fans. Thermostatically controlled, fan shuts off *automatically* when engine heat falls below efficient operating temperature . . . permits engine to maintain correct temperature, releases more horsepower for tractive effort.

LW Haulpak

Hauls up to 30% more payload than its weight

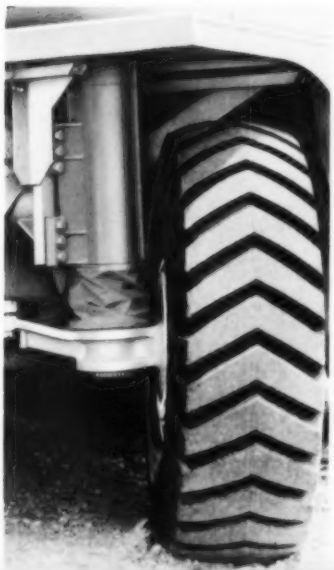
With Haulpak, more horsepower is used to haul the payload, little is wasted hauling useless truck-weight. Although light in weight, Haulpak is built exceptionally strong. Its body and box-beam frame are constructed of high-tensile-strength steel . . . nearly 3 times stronger than steel commonly used in trucks, yet it weighs ⅓ less. Frame structural members also serve as air reservoirs for the operation of air brakes . . . to further eliminate non-profitable dead-weight.



Turns in less space than the average pick-up — with a wheelbase of only 130", Haulpak makes complete 180° turn in area only 44½' wide — far less than units of similar capacity. This unusual maneuverability permits Haulpak to spot, swing around, back up, and dump without lost motion to delay hauling cycles.

Dumps in seconds — Twin 3-stage hoists lift body in seconds to a *high 70° angle* for fast, complete ejection of load. Body is exhaust-heated to prevent materials from freezing and sticking. There's no "carry-back" problem with Haulpak.

Needs *NO* daily maintenance — Haulpak's bearings *never* need lubrication . . . they're moly-coated to resist abrasion, packed in grease, and sealed for life. The entire Haulpak lubrication check — *needed only at 500-hour intervals* — consists of just 3 easily-reached grease fittings. What's more, you can operate a big Haulpak fleet on a *minimum parts inventory* . . . because final drives, Hydrair cylinders, wheels, and tires are interchangeable. Haulpaks work longer, harder, with less downtime . . . give you more output per man-hour.



Has no springs . . . rides on Hydrair*

Haulpak's exclusive air-hydraulic suspension system completely eliminates maintenance and repair of springs. 4 Hydrair units cushion against loading and travel shock. System compensates *automatically* for off-center loading and keeps unit riding level over humps and holes. Other Hydrair benefits to you: less dead-weight, higher ground-clearance. Hydrair cylinders fit close to wheels, up out of dirt and moisture.

*Trademark

Already a fully-tested hauler

This all-new LW Haulpak is the result of more than 3 years of research and development by LeTourneau-Westinghouse engineers — pioneers of a long list of earthmoving and hauling equipment. All three Haulpak models have been put through rugged tests under the toughest working conditions for over 14 months — in mines, quarries, and on construction jobs. Its various parts and assemblies — some of them tested and proved by *millions of hours* on LW Tournapulls all over the world — are much stronger than those on ordinary haulers. With the new LW truck you can be confident your truck maintenance, repair, and operating costs will drop to a new low . . . and your hauling tonnage will climb to new highs!

Your nearby LeTourneau-Westinghouse Distributor can give you full details on the new LW Haulpak. And, as a specialist in the earthmoving and hauling field, he can help solve any other equipment or service problems you may have. His shop is well-equipped . . . parts stock is complete . . . and his factory-trained staff is ready to provide you with the best possible service, day or nite. Call on him soon!

Note easy-loading features of Model 27 Haulpak as it gets heaping load of overburden in this quarry.

Here, 38.8-mph Model 32 Haulpak "highballs" a big load of overburden at iron mine.

Another load of rock moved in a hurry! This Haulpak works for an eastern contractor.

LW PARADE OF PROGRESS

continues

The new Haulpak truck is the latest addition to an impressive array of new and improved earthmoving and hauling machines being unveiled by LeTourneau-Westinghouse Company. They're part of LW's continuing program of product development to give you highest production equipment at lowest ownership-operating cost.

CONDENSED SPECIFICATIONS

HAULPAK MODEL:	LW 22	LW 27	LW 32
Capacity			
Tons	22	27	32
Heaped, cu yd	24	27	30
Struck, cu yd	15	18	21
Power	320-hp 6-cyl. Cummins diesel	335-hp 6-cyl. Turbocharged Cummins diesel	375-hp 6-cyl. Turbocharged Cummins diesel
Speeds	Step-gear trans. Five forward speeds to 37.4 mph, two reverse to 3.6 mph	Power-shift trans. Four forward speeds to 35.4 mph, two reverse to 6.9 mph	Power-shift trans. Four forward speeds to 38.8 mph, two reverse to 7.5 mph
Dimensions			
Length	23'10"	23'10"	23'10"
Width	12'0"	12'0"	12'0"
Height	11'5"	11'5"	11'5"
Wheelbase	10'10"	10'10"	10'10"
Weight (lb)	40,820	43,020	44,950

(Specifications subject to change without notice)

Litho in U.S.A. HP-2100-G-4

LW

Where quality is a habit

LETOURNEAU-WESTINGHOUSE COMPANY

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Yugoslav Cement Engineers Visit Pit & Quarry on U. S. Tour

Heading the Yugoslav cement production study team during its 6-week tour were Srecko Keglevic, (seated, second from left), general secretary of the Yugoslav Cement Industry Association, team leader; and A. E. Laurencelle (standing, third from right), who represented the International Cooperation Administration as project manager. PIT AND QUARRY personnel meeting with the group include James E. Montgomery, (center, front row), chairman of the board; Walter E. Trauffer (standing, far left), editor; James E. Kostka (standing, fourth from left), director of marketing and research; and Ray L. Smith Jr., senior vice-president, standing, second from right.

An exceptionally interesting departure from more common publishing activity was recently enjoyed by members of PIT AND QUARRY'S editorial staff and management on April 24 when they hosted a Yugoslav cement production team visiting this country.

Sponsored by the International Cooperation Administration, a six-week tour was set up to provide the eight visitors with the opportunity of visiting several cement mills, equipment manufacturers, fabricators of concrete products, and certain government agencies including the Department of Labor. In the development of their itinerary, the engineers indicated a desire to meet with the PIT AND QUARRY staff for a day of informal discussion on cement production and operating problems in this country.

Among the many points of interest to the group were the latest developments in equipment involved in preheating, homogenization of kiln feed (dry process), bulk solids handling, transport, automation, and the factors involved in publishing a magazine covering cement production and utilization.

Several interesting facts concerning Yugoslav cement production were also brought out. Currently that country's capacity is rated at about 12,000,000 bbl. annually—obtained from both horizontal and vertical kilns. The Yugoslav engineers hope to remove all vertical units in the near future, and go entirely to the rotary type. Expansion and improvement efforts are expected to raise production by 30 to 40 percent in the next two years.

The group was escorted on the tour by A. E. Laurencelle, who represented the I.C.A. as project manager. Two interpreters—Dusko Duisin and Charles Wiesner, of Yugoslav birth but now U.S. Citizens—also accompanied the group. Srecko Keglevic, general secretary of the Yugoslav Cement Industry Association, Zagreb, Yugoslavia, was leader of the production study team. His colleagues included the following: Radoslav N. Bregun, chief engineer, cement plant, Beocin; Ivan Kocuvan, general manager, cement and asbestos cement plant, Anhovo; Dragutin S. Kuk, foreman, rotary kiln department, Sloboda cement plant, Zagreb-Podsused; Dusan Mladinov, assistant manager, Dalmacija cement plant, Solin; Ivan E. Ovcar, manager, Dalmacija cement plant; Alfred F. Petric, chief engineer, Trbovlje cement plant, Trbovlje; and B. N. Raketic, managing director, Konstrukcioni Biro Gradjevinske Industrije, Zagreb.

Metzger Named Vice-President of Calaveras Cement Company

Directors of Calaveras Cement Company recently elected Grant W. Metzger as vice-president in charge of production. Mr. Metzger, manager of the company's San Andreas, Calif., plant since 1953, succeeds the late E. M. Barker.

Grant W. Metzger

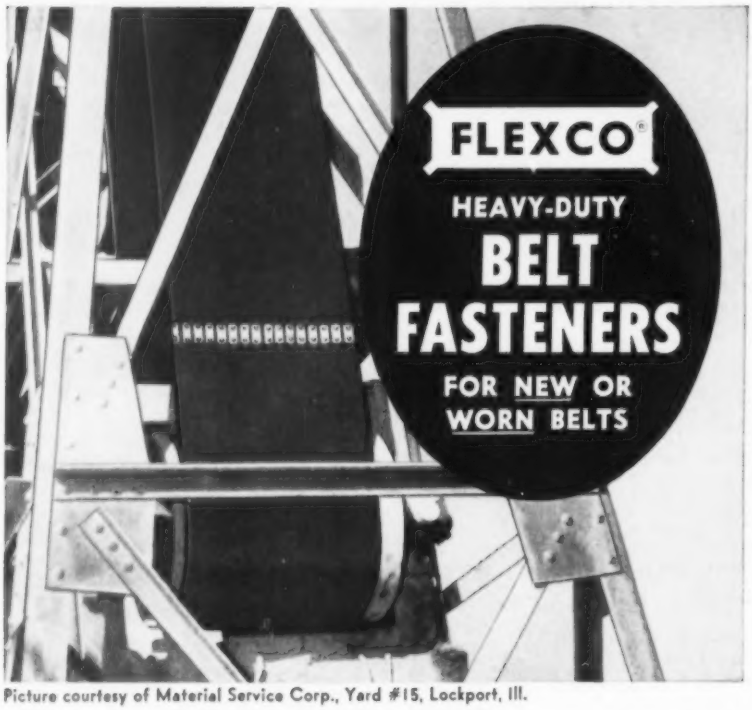
Mr. Metzger joined Calaveras as assistant to the plant manager in January, 1951. He supervised construction of the fourth of the company's five huge kilns.

Prior to joining Calaveras, Mr. Metzger served with Newmont Mining Company in Grass Valley, Phelps Dodge Corporation at Morenci, Ariz., as sales engineer for Alpha Hardware Company in Grass Valley, and as mining consultant to various Mother Lode mining firms.

Orrin E. Weeks, who has been named San Andreas plant manager, has served Calaveras since 1951.

The Los Angeles perlite plaster aggregate plant of International Minerals and Chemical Corporation was recently sold to Redco, Incorporated of North Hollywood. I.M.C. will concentrate on expansion of its raw perlite ore business.

ANOTHER FLEXCO SPLICE DOING A DEPENDABLE JOB AT *MATERIAL SERVICE CORP.*



Picture courtesy of Material Service Corp., Yard #15, Lockport, Ill.

Cutaway of a Flexco application showing compression plates, teeth and precision-made bolts and nuts.

Belt maintenance crews like to work with Flexco fasteners because they are easy to apply — joints last a long time — worn plates can be replaced quickly — ideal for repairing rips and tears.

PROTECT YOUR INVESTMENT IN CONVEYOR BELTS WITH FLEXCO . . . The quality fastener for all heavy-duty conveyor belt applications: SAND & GRAVEL, CRUSHED ROCK, COAL & METALS, CONSTRUCTION EQUIPMENT, etc.

Available in Steel, Monel, Stainless, Everdur. Also Promal top plates.

NEW "25-PAK"

"25-PAK" contains enough fasteners to join common belt widths.

ORDER FROM YOUR DISTRIBUTOR, OR WRITE TO US FOR BULLETIN F-112.

"FOR THE SPLICE OF A LIFETIME"

Flexible STEEL LACING COMPANY

4623 LEXINGTON STREET • CHICAGO 44, ILLINOIS

Enter 38 on card, page 155

Stockholders O.K. Merger Of Gen. Portland Cement With Consolidated Cement

Stockholders of both General Portland Cement Company and Consolidated Cement Corporation, Chicago, recently approved the merger of these two companies. The merger was completed April 30, and the re-elected directors of both companies have become members of the board of the combined company.

A dividend was declared of 25 cents a share on General Portland's common stock. It is payable on General Portland shares outstanding after the merger, which split each share of General Portland common stock into two shares. It also converted each share of common stock of Consolidated Cement into 1⅕ shares of common stock of General Portland Cement Company.

1958 Profits Rise 145% For St. Lawrence Cement Co.

A net profit of $846,104 was earned in 1958 by the St. Lawrence Cement Company, Villeneuve, Quebec, as compared with 1957's profit of $344,986.

A quarry on Lake Ontario purchased recently will be in operation during 1959, and substantial savings are therefore expected in the cost of the company's principal raw material. Annual productive capacity of St. Lawrence now exceeds 24,000,000 bags of portland cement.

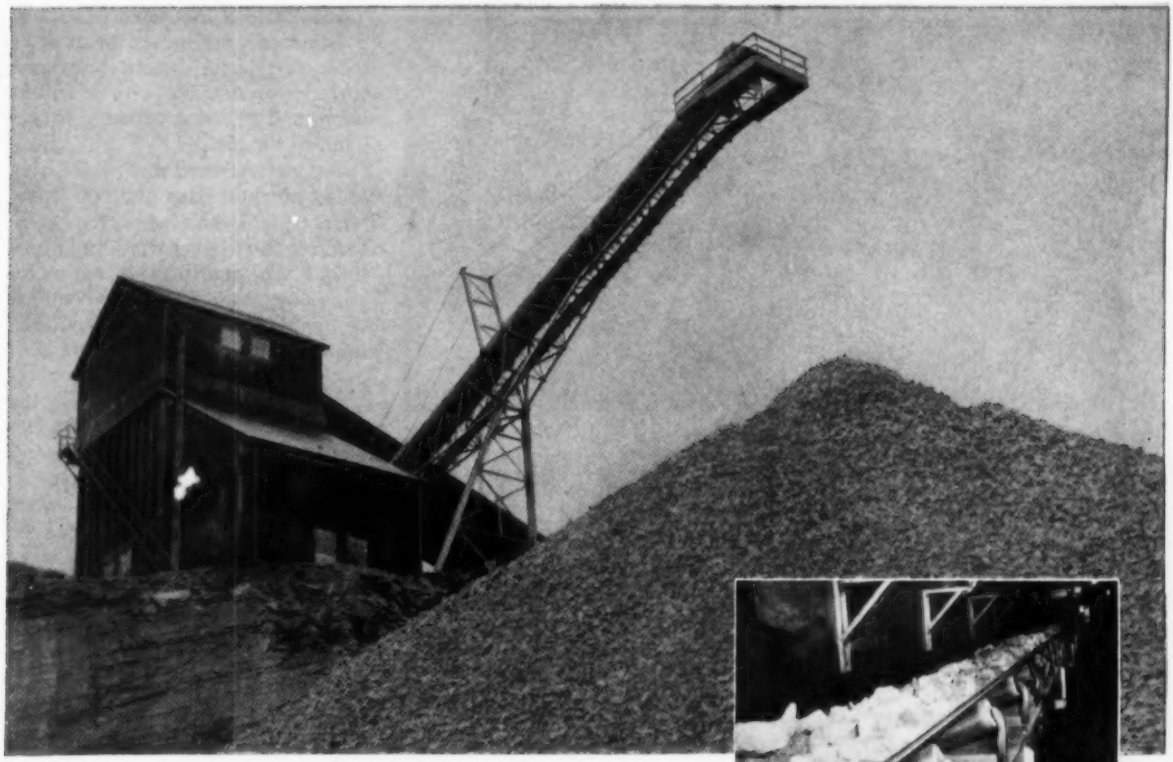
Record high sales of $114,395,800 in 1958 have been reported for Material Service Corporation of Chicago, with an accompanying increase in profits. Net income was $12,536,000 — an increase of approximately eight percent, compared with $11,139,000 in 1957. Earnings included substantial nonrecurring items.

• • •

Our Cover Picture

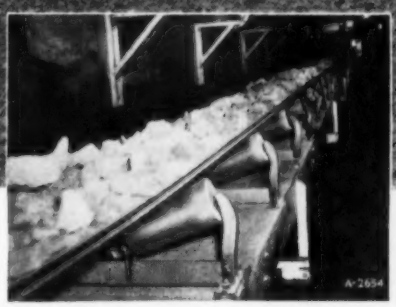
From the blueprints such as these—reflecting the intensive engineering work required to bring the outstanding construction projects of this century to fruition—are built the many related and complex installations on which that construction depends. In this case, the immense aggregate plant erected by Channel Constructors to supply all concrete aggregates for the huge Niagara Power Project. The section displayed here is but one very minute part of the staggering amount of engineering detail required. Full details on this engineering effort are presented in the article on p. 74.

STEPHENS-ADAMSON



BELT CONVEYOR SYSTEMS LOWER STONE & AGGREGATE HANDLING COSTS

A river of stone and aggregate is carried daily over the innumerable sand, gravel and rock handling and processing installations designed and built over the years by STEPHENS-ADAMSON engineers. Every operator's handling problem receives individual consideration and over 58 years of STEPHENS-ADAMSON engineering "know-how" provides a valuable source of ideas for meeting and solving the problems of each new installation. The final result is always the same . . . bulk materials are handled at the lowest cost per ton. Backing up the "know-how" and experience is a quality engineered line of components, each providing an exclusive combination of features—many of them carrying patents by S-A engineers. Put STEPHENS-ADAMSON engineering experience and manufacturing skill to work for you —write for full information today!



Stone rides uphill on a 19 degree slope from a gyratory crusher. The 36 inch wide belt, pictured, carries 650 tons per hour along a 439 foot run.

S-A CURVE-CROWN PULLEYS
—Maximum belt training effect with minimum belt stretch and wear are provided with exclusive S-A CURVE-CROWN design.

WRITE FOR BULLETINS 355 and 558

S-A
MATERIALS HANDLING PRODUCTS
SEALMASTER® BALL BEARING UNITS

ENGINEERING DIVISION
STEPHENS-ADAMSON MFG. CO.
GENERAL OFFICE & MAIN PLANT, 20 RIDGEWAY AVENUE, AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

National Gypsum Company's new dock and ship-loading terminal on Tawas Bay in Michigan. The conveyor-loader combination can fill the hold of an 8,500 ton capacity lake freighter in less than 8 hours. Gypsum is shipped from the quarry six miles by rail to the loading terminal stockpile (upper right). A half-mile conveyor system moves the material from the stockpile to the automatic loading station on the 1,100-ft. long dock.

New Gypsum Operations Span Great Lakes

The first shipload of gypsum ore from National Gypsum Company's new northern Michigan mining development arrived at the company's new plant at Waukegan, Ill., on May 6.

Docking of the ship constituted the first link-up of parts of National Gypsum's new $25,000,000 Great Lakes gypsum mining and its products manufacturing network.

The construction of the St. Lawrence Seaway influenced National Gypsum management to undertake this impressive expansion program. According to the company's chairman of the board, Melvin H. Baker, "Due largely to the Seaway, the Great Lakes area will experience a building boom during the next decade.

"Census Bureau forecasts," he continued, "point to a ten-year population increase for the areas bordering the Great Lakes that will be far in excess of the national average. This will mean a boom in home building and other types of construction. We are preparing for this upsurge of building material demand."

The Waukegan plant will turn out wallboard, lath, plaster, and other gypsum building products for Chicago, Milwaukee, and other construction markets in northern Illinois and Wisconsin. A new plant now under construction at Lorain, Ohio, will supply markets of that state. The company's plant at National City, Mich., supplies Detroit and other Michigan markets.

Raw material for these operations originates at an open pit mine near Tawas City, Mich., on the western shore of Lake Huron. The company reports sufficient reserves at Tawas to supply these plants for over 100 years.

National Gypsum's prospecting team discovered the massive deposit of high-grade gypsum at Tawas in 1954. Located six miles from the natural harbor of Tawas Bay, it offered a location from which to supply new plants on the lakes by water transport. After market studies confirmed the advisability of the undertaking, the company began the development of the quarry phase of the expansion program in 1956.

Hundreds of thousands of tons of overburden were moved to uncover the rich gypsum deposit below the surface. A dragline with a 160-ft. boom and a 17-ton capacity bucket handled the task.

As quarry work progressed, six miles of connecting railroad spurs were laid to the Tawas Bay shiploading site. A second railroad spur linked the quarry with the company's gypsum products plant at National City, Mich., nearby. Crushing and screening stations were built at the quarry.

After crushing and screening, the raw gypsum is stockpiled. A reclaiming tunnel conveyor beneath the stockpiles transfers the gypsum from storage to railroad cars when a shipment is being readied for the National City plant or for lake shipment.

For the latter, an automatic rail unloading station was installed 2,000 ft. inshore, from the dock. A half-mile conveyor belt system moves the gypsum from a stockpile at the unloading station to the dock during shiploading operations. The 1,100-ft. concrete and steel dock is a fully automatic shiploading terminal.

Charles Hill is manager of the Tawas City quarry and loading terminal; he also directs the company's National City plant. Mardis Turner is manager of the new Waukegan plant, where production is to begin in June.

Damage estimated at $250,000 was sustained in a fire which recently destroyed the Basic Chemical Corporation's plant at Glenwood Springs, Colo. The plant, in operation since 1955, provided limestone products for uranium mills in western Colorado and eastern Utah.

Sales volume of General Refractories Company rose 114 percent in April, compared with sales in the same month of 1958. Sales for the first four months of 1959 were 85 percent ahead of the same 1958 period: $16,019,120, compared with $10,219,321.

Industry's top technical team at your service

ALLIS-CHALMERS builds a complete line of processing machinery for the nonmetallic minerals industry. Allis-Chalmers also produces electrical generation, distribution and utilization equipment. Out of this unequalled diversity has come the unique ability to integrate equipment for a complete process — yes, even for an entire plant.

Each Allis-Chalmers product department has its own specialists. Ideas and technical information received from many departments are correlated in *one* department specializing in *nonmetallic minerals industry application*. Components are matched to your requirements. New equipment is integrated with existing equipment into a productive, profitable operation.

Get all the facts. See your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.

Laboratory testing takes guesswork out of planning

In the Allis-Chalmers processing laboratories, samples can be put through crushing, grinding, screening and other tests to predetermine the right equipment and process for any given circumstance.

"Work Index" method prevents misapplication

The "work index" formula used by Allis-Chalmers offers the only scientific method of determining equipment size and horsepower requirements.

Continuous field service keeps operation running smoothly

Your A-C representative makes a periodic checkup of equipment performance . . . passes on maintenance tips . . . arranges for additional testing. Orders for replacement parts are given emergency treatment.

At Allis-Chalmers, integrated thinking precedes the application of your integrated equipment

ALLIS-CHALMERS

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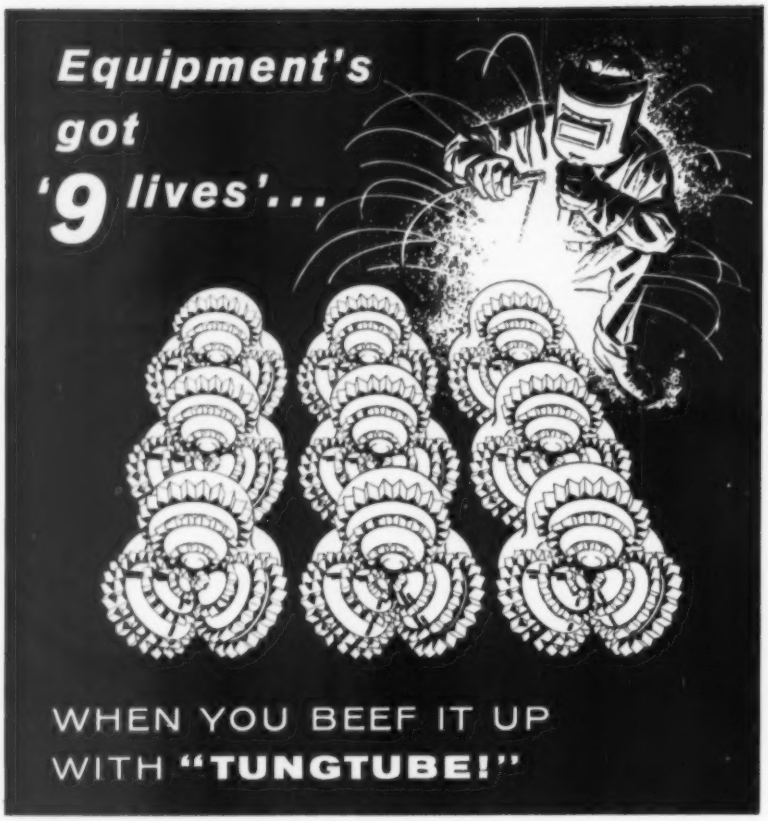

TO KEEP EQUIPMENT ON THE JOB AND CUT COSTS... HARDFACE WITH AIRCO TUNGTUBE

If you're chewing into granite, shale, coal or other non-metallics, build up your equipment surfaces with Airco hardfacing alloys. Take Airco Tungtube. Great for cutter bits, core bits, drill bits, dredging cutters and many other kinds of pit and quarry tools.

Deposition rate is high. Cost low.

Tungtube is the preferred stick among operators too, because of its easy handling ways in either bare or coated form.

TO IMPROVE YOUR HARDFACING AND WELDING OPERATIONS... CALL IN YOUR AIRCO MAN

Somewhere along the line you can draw a profit from Airco experience in hardfacing and welding. Airco makes hundreds of electrodes of all classes and types . . . produces all industrial gases used in hardfacing and welding . . . makes a full line of high performance hardfacing and welding equipment and supplies.

We'd like to help you. Call your nearby Airco office or Authorized Airco Dealer. See the Yellow Pages under "Welding Equipment and Supplies."

The pure tungsten carbide particles in Airco's Tungtube hardfacing electrode are of uniform size. Cubical diamond form presents the maximum number of high strength cutting edges. This is typical of the features that give "nine-life" performance to equipment rebuilt with Airco Hardfacing Alloys.

Tungtube withstands severest abrasion. Hardness over 80 Rockwell C. Screen sizes 10-20, 20-30, 30-40, 30-down and 10-30.

Other Airco Hardfacing Alloys include Airco 361 — for build-up and repair of manganese steel — withstands severe impact and considerable abrasion. Aircolite 59—for superior abrasion resistance. Airco 388—an all position, self hardening electrode — resistant to impact and abrasion.

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Enter 42 on card, page 155

Two Mines Bureau Directors Receive Service Medal Awards

The Distinguished Service Award and gold medal of the Department of the Interior were recently presented to two administrators of the U.S. Bureau of Mines for outstanding service.

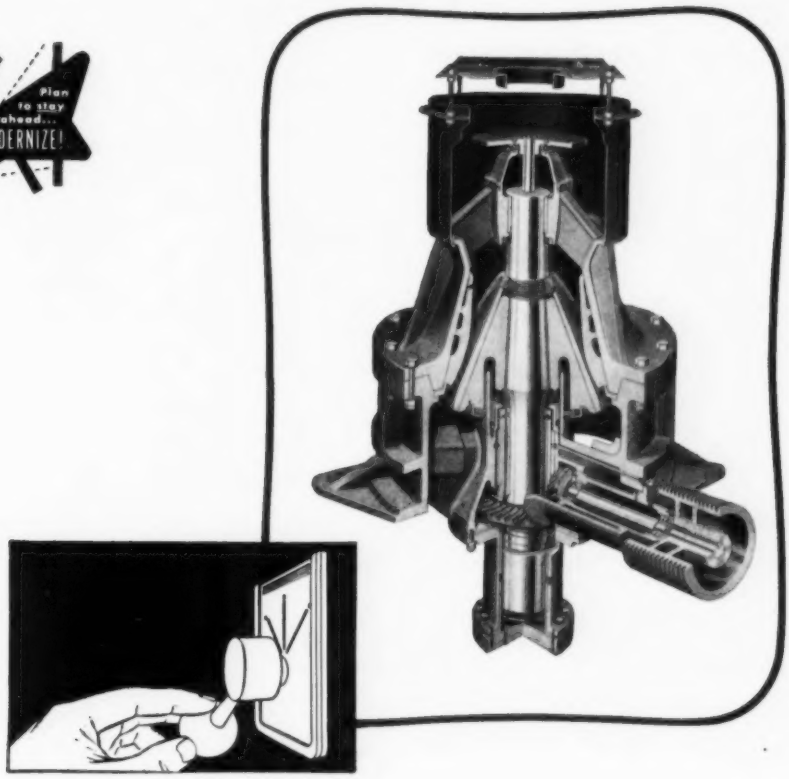
Marling J. Ankeny, Bureau of

Marling J. Ankeny

Mines director, received his award in recognition of contributions to the advancement of mine safety during 26 years of government service. He became the chief administrator of the Bureau in July, 1956.

Earle P. Shoub of Pittsburgh, Pa., regional director of the bureau's Region V, was honored for "exceptional administrative ability and technical skills" during his 17 years with the Bureau.

Earle P. Shoub



Just a minute...

that's all it takes one man to change settings in a *Hydrocone* crusher

Flip a switch . . . adjustment to precise product size is that easy. Compensation for wear and emergency unloading are also one-man, one-minute operations. Only Allis-Chalmers gyratory crushers offer this remarkable speed and convenience.

Bulletin 07B7145C tells the complete *Hydrocone* story. Get a copy from your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.

Hydrocone is an Allis-Chalmers trademark.

A-C **ALLIS-CHALMERS**

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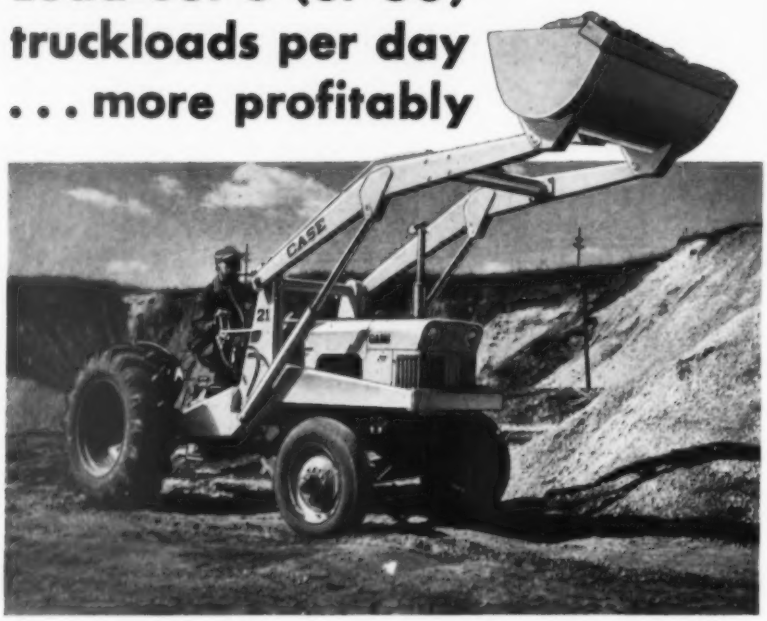
Load-out 6 (or 60) truckloads per day . . . more profitably



CASE *Utility* LOADER

speeds service, cuts costs on small yardage orders

Now handle small-yardage orders profitably with Case 210 *Utility* Loader. Drive to loading site at rubber-tired speeds. Cycle fast. Lift half-a-ton per pass. Service several haulers for a few dollars a day. Also handle your stockpile clean-up, road and plant maintenance with optional attachments.

Case 210 high-torque 126-cu. in. engine and powerful hydraulics give you smooth loading action. Husky unit exerts 2150 lbs. breakaway, clears 8'5" after dumping, for fast dump-and-go. Optional power-steer and shuttle transmission add extra maneuverability and speed for fast, continuous cycling. Choice of 3 buckets to ⅔ cu. yd.

Long, trouble-free service is assured by ferrometallic clutch, rugged transmission, anti-friction bearings in drive, and one-piece forged front axle. No other loader in its class gives you so much workpower and durability for the money. CU-L-126

as little as **$92.00** per month

Complete Case 210 Loader with 11-cu. ft. bucket, after average down-payment or trade-in, f.o.b. factory — plus freight, taxes, installation. Price subject to change without notice.

Try a Case 210 on your job . . . FREE!

For full details and name of nearest Case Dealer — write . . . wire . . . or phone . . . today!

CASE

J. I. CASE CO., RACINE, WIS., U.S.A.
DEPT. F1149

Enter 44 on card, page 155

Lyman-Richey Sand-Gravel Celebrates 75 Years Of Continuous Operation

This year the Lyman-Richey Sand and Gravel Corporation, Omaha, Nebr., is celebrating the 75th anniversary of the firm's founding. Formation of the business took place in Lawrence, Kans., in 1884, and the operation was moved to Omaha in 1892. Several other firms were absorbed, one of which was the Richey Sand Company (1918).

Production rose from an output of less than 10,000 tons in the first year to a record total, 3,374,140 tons, in one of the all-out effort years during World War II. Power has progressed by stages from *actual* horsepower to steam and gasoline engines and then to electric horsepower.

Whereas only pit-run sand was at first produced, Lyman-Richey now offers materials meeting 36 different specifications. Its operations also include three ready-mixed concrete plants.

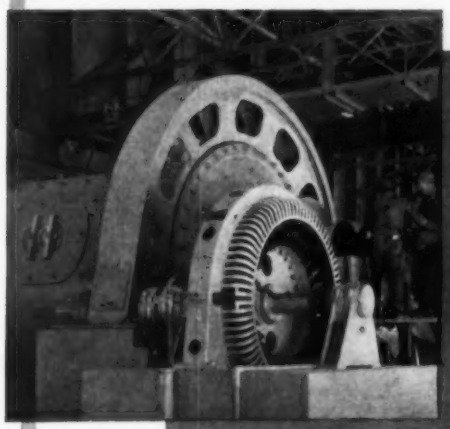
In line with the firm's policy that most employees are not expendable at age 60 or 65, Lyman-Richey lists in its Twenty-five Year Club men who have been on the payroll for as long as 49 years. Fred P. Curtis, president, has been affiliated with the company for 44 years. Long-term associations have also been enjoyed with customers, many of whom have been doing business with Lyman-Richey for 50 years, and one for 66 years.

Outstanding safety records have been achieved at the 13 Lyman-Richey plants, one of which racked up 13 years without a lost-time accident. In five different years there were no lost-time accidents at any of the firm's production plants; and Lyman-Richey operations have won three national safety awards since 1951.

To implement management's belief in land restoration, worked-out areas have been converted into many lakes. The state has purchased 1,042 acres of such land, and private interests another 1,343 acres for recreational areas.

At the program enjoyed upon the occasion of the 75th anniversary

New insulation adds years to motor life



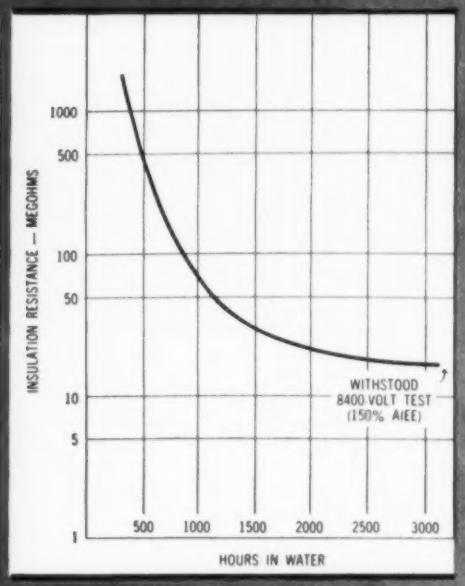
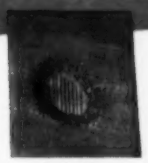


Chart shows insulation resistance in water of a 2300-volt *Silco-Flex* insulated coil, completely immersed with 2300 volts applied continuously.

Silco-Flex Insulation

Polyester Mica Tape



Asphaltum Mica Tape

Sandblasting proves the difference! Only *Silco-Flex* insulation stood up after one minute using 90-grit aluminum oxide and 100-psi air from distance of 6 inches.

Super-Seal motors withstand abrasion, physical stresses, moisture, heat aging

A drip-proof enclosure is usually all you need with the remarkable new insulating systems and advanced mechanical features of *Super-Seal* motors.

New motors are protected with the *Silco-Flex* stator coil insulating system: A homogeneous dielectric barrier of vulcanized silicone rubber possessing unmatched resistance to abrasives, moisture and most corrosive or chemical atmospheres.

Synchronous machines have *integrated* field coils that seal against contaminants . . . bond and lock against mechanical forces.

Contact your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Super-Seal and Silco-Flex are Allis-Chalmers trademarks.

A-5922-CM

ALLIS-CHALMERS

NEWS ABOUT THE DUMP BODY BUSINESS

Increase Your Earning Power with MARION'S New Front End Hoist For 8, 9, 10 Foot Bodies

Another rugged and competitively priced Marion hoist is now available in three models for 8, 9 and 10-foot bodies. Outstanding features incorporated in the hoist provide time and performance saving benefits for all users.

- The method of attaching the cylinder to the body speeds up installation and allows fast, easy detachment for any servicing in the field (see diagram).
- The deep oil reservoir, mounted on the side, provides a quieter, cooler, more efficient hydraulic system and eliminates the danger of drawing air into the system
- Weight savings from 65 to 270 pounds
- Fast dumping speed
- Pump with safety relief valve.

Write for a bulletin covering the three models, F-5131-65-72-82.

MARION METAL PRODUCTS CO.
Marion, Ohio, U.S.A.

The top plate is connected to the top of the cylinder before the body is installed. Then as the body is let down, the cylinder will guide itself into place in the cylinder housing. The body is then secured from the outside at the top by two bolts that fasten the body to the top plate.

Enter 46 on card, page 155

dinner special speakers were the Honorable Ralph G. Brooks, governor of Nebraska, and Vincent P. Ahearn, executive secretary of the National Sand and Gravel Association.

Officers of the company include the following: Fred P. Curtis, president; George R. Bathe, vice-president; Dorman H. O'Leary, vice-president; Lewis C. Curtis Jr., secretary; and Frank W. Bahr, treasurer.

Directors, in addition to Messrs. Curtis, O'Leary, and Bathe, include Ralph E. Svoboda and Yale Holland.

Livingston Rock & Gravel Merges With Arrow Rock Co.

Arrow Rock Company of Sun Valley, Calif., has been merged into Livingston Rock and Gravel Company, Incorporated, according to Carder B. Livingston, president of the Long Beach, Calif., firm. Arrow produces ready-mixed concrete, sand and gravel, and operates plants at Duarte, Sun Valley, and Chatsworth.

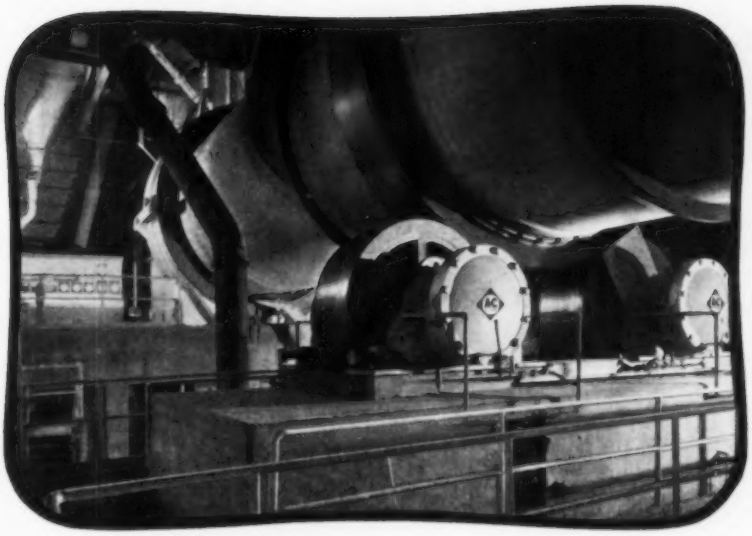
In announcing the merger, Mr. Livingston stated that George Schuckert, area sales manager for Arrow, would remain in the same position with Livingston Rock and Gravel, and that no other changes are contemplated in either executive or supervisory personnel.

Cris Dobbins of Ideal Cement Honored by Regis College

Cris Dobbins, president of Ideal Cement Company, was among four recipients of Civis Princeps (first citizen) awards presented by Regis College of Denver, Colo., at the second annual Civis Princeps banquet held at the school recently.

The awards are given to persons who have made significant contributions to the growth and development of their state. Mr. Dobbins was chosen for the honor in the field of business and industry for "his perfect demonstration of the American tradition of hard work and high loyalty."

Havard E. Griffith has been appointed salesman for the Alpha Portland Cement Company in the central Pennsylvania area, which includes Harrisburg, Williamsport, and State College.



Plan to stay ahead... MODERNIZE!

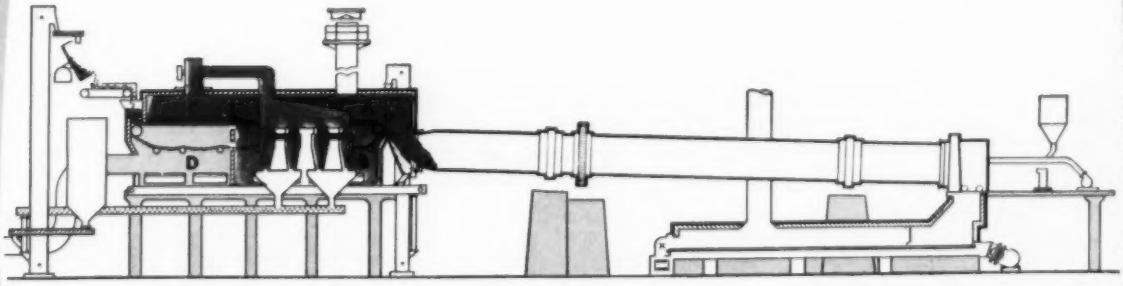
ACL pellet process cleans up cement making

Pelletizing of raw materials makes possible the dust-free operation of the *ACL* "double-pass" traveling grate system.

Along with clean production, making cement with pellets affords a barrel of bonus benefits — product reclamation, maximum burning efficiency, power savings, small space requirements.

How *ACL* "Double-Pass" System Works — In first pass (A to B) 1800° gas from kiln partially calcines feed in section nearest kiln. Gas temperature is reduced to 500°. Cyclones reclaim air-borne dust. In second pass (C to D) green pellets are dried and heated to about 500°. Gas stripped of heat and dust is exhausted in a mere wisp.

For the complete story, see your A-C man or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers, Ltd., Box 37, Montreal, Quebec.



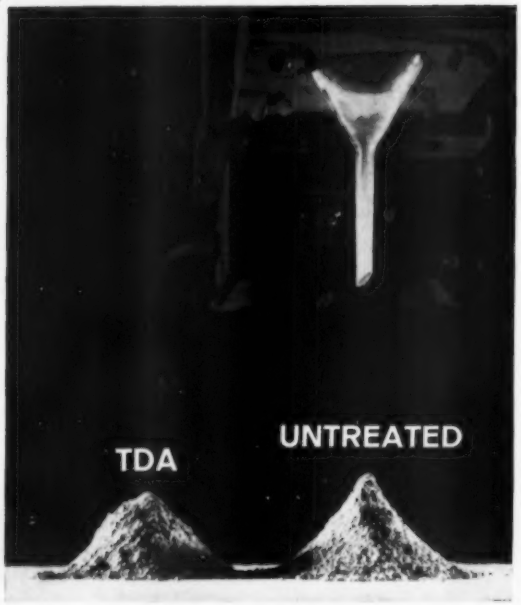
ACL is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-5930-CM

How to save up to $84

unloading a car of cement



Laboratory test demonstrates dry-dispersion characteristics of TDA-treated cement. Here, cement samples poured from mechanically-vibrated funnels under closely controlled laboratory conditions are graded by their resulting slope, or "angle of repose." The lower slope of TDA-treated cement signifies greater dispersion, lower resistance to flow.

Two able-bodied men should be able to unload a hopper-car of cement in an hour or two. But if the load has become compacted or pack-set en route, the same job may take two days . . . 32 man hours, at $3 per hour!

There's a practical way to beat the problem. The answer is Dewey and Almy's TDA, a cement dispersant which makes cement flow easily and smoothly. In fact, tests show that TDA cement is 6 times easier to start flowing than untreated cement.

TDA is also a *grinding aid* which can increase mill output 10-50%, depending on conditions. When you consider this combination of benefits, doesn't it make sense to evaluate the use of TDA in *your* cement?

W. R. GRACE & CO.
DEWEY AND ALMY CHEMICAL DIVISION
Cambridge 40, Mass.

Dewey and Almy Chemical Division, W. R. Grace & Co.
622 Whittemore Avenue; Cambridge 40, Massachusetts
Attention: Rock Products Chemicals Department

☐ Please forward the new TDA "Pack-Set" Bulletin

☐ Please make arrangements for your engineer to assist in a full-scale test grind at our plant.

NAME.....

TITLE.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

Enter 48 on card, page 155

NEW STRENGTH, NEW DRIVE CUT COSTLY DOWNTIME

New Cross-Lug U. S. Royal Fleetmaster Dual-Purpose-Nylon beats the tire hazards that can wreck tight schedules!

Operators of sandpits and quarries all over the country are finding out that using this great new U. S. Royal Fleetmaster Dual-Purpose reduces job delays due to tires. Its 52% stronger body, of exclusive Double-Strength Nylon cord, defies impacts that ruin ordinary tires. Its big, deep cross-lugs dig in for 35% greater traction, prevent spinning wheels, bogged-down trucks, broken schedules. See it for yourself. Call your U. S. Royal Dealer right now. And make sure to specify "U.S. Royal" on the next new equipment you buy! Available in tubed or tubeless construction.

U.S. ROYAL SAFETY 1st TRUCK TIRES

US RUBBER **United States Rubber**

Rockefeller Center, New York 20, New York

new machinery

● Three new and improved models of its Type 8 rotary drill have been made available by the Davey Compressor Company. The Model M-8A is a rotary blast unit, designed for mounting on any standard truck. It has a rated capacity in excess of 1,500 ft., using a 2⅞-in. API drill pipe. Power for its operation may be drawn from the truck engine through a Davey heavy-duty power take-off, or it may be operated by a separate gasoline or diesel power unit. The compressor for air blast drilling is a 500-c.f.m. machine.

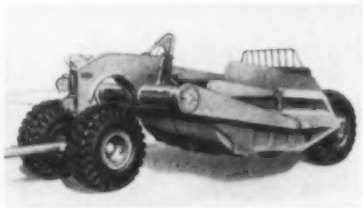
The drill mast has a 25,000-lb. working capacity. It accommodates an 18½-ft. kelly and 15-ft. drill pipe. Pull-down is chain operated of the hydraulic-automatic type. Draw works are two-drum, in line, with a capacity of 10,000 lb. each. The rotary table has a full 8-in. opening.

The new M-8AL model is similar to the M-8A, but is equipped with a special long kelly and mast. It can drill 24-ft. ledges without changing steels.

Model M-8MA is a combination air blast and mud rotary rig. In addition to the regular M-8A features, it is equipped with one of several types of mud pumps, available to match job requirements. Change from mud to air blast drilling is accomplished by shut-off and by-pass valves.

Rated capacity lists normal performance with air blast and 6-in. drill bit as 600 ft. in fair to good sedimentary rock formation. With mud, capacity is over 1,000 ft., using a 9-in. bit. Maximum hole size is 20-in. diameter. **(351)**

● Caterpillar Tractor Company has introduced a new crawler tractor-drawn scraper, offering increased capacity, greater flotation, and more durable construction. Designated the No. 463 Series C scraper, the



new unit can be used with either D8 or D9 tractors without modification.

Struck capacity of the scraper has been increased from the previous model's 18 cu. yd. to 22 cu. yd. Heaped capacity has been increased from 25 to 29 cu. yd.

Increased flotation has been accomplished by the use of wide-base tubeless tires: 26:5 x 25 on front wheels, and 29.5 x 29 on rear.

Structural improvements include two new support ribs which strengthen the welds between the bowl sides and cutting edge supports and new internal braces which have been added between the back and bottom of the bowl. The draft frame structure has been changed in most components, the beam being strengthened approximately 30 percent. The apron top section has been given greater inherent strength by changing to angular rather than tubular construction. Apron arms are solid, and forged connector has been included between arms and apron front. **(352)**

● A trackside permanent-mount vibration inducer for accelerated push-button unloading of all types of bulk materials from hopper bottom railroad cars, entrain or singly, is announced by the Martin Engineering Company.

In the photograph, the shaker has been hydraulically pushed against the side of the hopper car in shake-out position. One man operates the unit without having to crawl beneath the car for any reason.

Operation of the Vibrolator car shaker is simple: railroad cars are placed over conventional track hoppers and after the car gates have been opened, the vibrator head is pushed against the side of the car by means of a hydraulic cylinder.

A push-button switch activates the drive motor and a belt-driven vibrator head generates massive imbalance forces. This impact is transmitted to the side sill of the car and directly to the sloping portion of the hopper. **(353)**

and equipment

for further information use card on page 155

● Rolling outriggers designed to fit all makes and models of truck cranes are being manufactured by the Lincoln Welding Works.

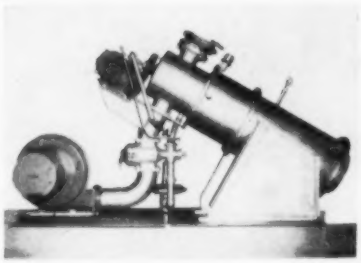
Experimental tests attempting to adapt wheels to outriggers led company engineers to the discovery that a tandem, pivotal action wheel assembly would allow near-capacity loads to be moved over level or rugged terrain, eliminating the time-consuming and costly practice of setting and resetting conventional outriggers and pads. In addition, this wheel assembly makes possible a greater load distribution and prevents over-stressing the crane carrier. **(354)**

● Manufacture of a new line of DA 358 V-belts in 3V, 5V, and 8V sizes has been announced by the Durkee-Atwood Company. These V-belts, according to the manufacturer, have the ability to transmit more horsepower in a given area at lower cost and with fewer belts, smaller and lighter sheaves, and shorter center distances.

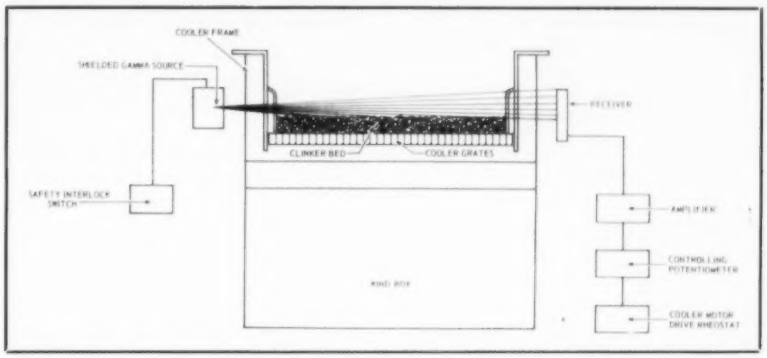
Compared with the conventional multiple V-belt, the DA 358 features increased sidewall area which, together with a domed top, frees the entire sidewall for power transmission purposes. Other features include a new strength member which makes possible a reduction in the number of cross sections needed for multiple drives, and newly-designed sheaves incorporating narrower grooves and closer groove spacing for a highly compact drive. **(355)**

● Developed by the Steel Processing Division, Fort Pitt Bridge Works, this Model B feeder-heater unit combines mechanical and combustion principles to provide simplified heat treatment of vermiculite and perlite ores for lightweight aggregates, limestone fines, and similar materials.

In operation, material is fed continuously through the unit by a short screw feeder. It is then picked up by and carried with combustion air through a stable flame where it is heated while in suspension. The resultant discharging mixture is directed through the refractory-lined tubular furnace. The material drops out by gravity, with the gases going through a cyclone for cleaning.



The Model B is available in capacities up to 4,000 lb. per hour of finely-divided material, heated to 2,400 deg. F. With proper ratios of fuel and air, uniform heating as low as 400 deg. F. or as high as 2,400 deg. F. may be applied. The unit can be used with various types of new and existing furnaces, and can be mounted horizontally and fired through the furnace wall. **(356)**



● A controller which automatically regulates clinker bed depth in air-quenching coolers to improve kiln operation and reduce cooler maintenance has been developed by the Allis-Chalmers Manufacturing Company.

The new package controller levels the depth of clinker bed on the cooler grates, resulting in stabilized temperature of secondary air going to the kiln and more constant and lower excess oxygen in the exit gases. Use of the controller, therefore, effects an increase in kiln capacity and/or fuel savings.

During the controller's operation, a nuclear source radiates through the cooler to indicate on a receiving unit the depth of clinker on the cooler grates. When irregular clinker discharge from the kiln causes the bed depth to rise or fall below predetermined levels, this information is passed from the receiver through an amplifier to a recording-controller potentiometer. This, in turn, controls a rheostat drive unit to increase speed of the cooler motor drive, thus returning the bed depth to its predetermined level.

The controller also continuously records bed depth on a circular or strip chart. **(357)**

● A heavy-duty front end loader and digger combination employing a common sub-frame and powered from a single Sherman Hydra-Loop hydraulic system has been introduced by Sherman Products, Inc. The integrated hydraulic system is designed to permit the operation of digger and loader simultaneously.

The new loader has a breakaway capacity at bucket lip of 5,000 lb. and a full lift capacity of 2,500 lb. With the series 601 and 801 Ford and Fordson Dexta tractor, the loader has a breakaway capacity of 4,000 lb. and a lift capacity of 2,000 lb. Bucket lifts to 10 ft. 6 in. and dumps at a maximum of 8 ft. 9 in.

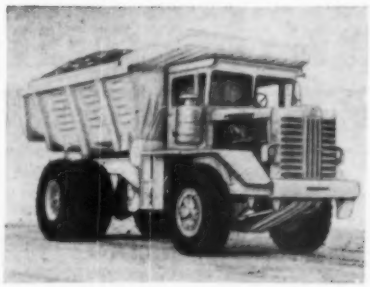
The loader utilizes the same heavy duty sub-frame as the power digger. The full length box frame and channel construction sub-frame assembly provides additional rigidity and equalizes digging and loading stresses throughout the tractor.

The power digger has an uninterrupted pivot arc of 180 deg., with a reach of 18 ft. at grade and 12 ft. below grade. Available digging force is 19,250 lb. from a hydraulic system rated at 15 g.p.m. at 1,750 r.p.m. with an operating pressure of 200 p.s.i. **(358)**

● International Harvester Company has in production two new Payhauler off-the-highway rear dump trucks featuring powerful new diesel engines and corrugated bodies which reduce deadweight by 30 percent. The units are the Model 95 Payhauler (illustrated), with heated body and a struck capacity of 18 cu. yd. and a 27-ton payload, and the Model 65 Payhauler, with a struck capacity of 12.5 cu. yd. and a 19-ton payload.

Powering both trucks is the most powerful diesel engine built by International Harvester—the 817. The 27-ton unit is equipped with the turbocharged version, the DT-817, with a maximum horsepower rating of 375 at 2,100 r.p.m. The naturally-aspirated D-817 engine, developing 250 maximum horsepower at 2,100, powers the 19-ton model.

Speeds up to 38 m.p.h. are obtainable with the 27-ton Model 95. A choice of torque converter with power-shift, or nine-speed, air-shift transmission is offered. The 19-ton Model 65 delivers speeds to 36.46 m.p.h. through a ten-speed, constant-mesh transmission. Both units offer



fast reversing, up to 7.1 m.p.h. in the gear drive Model 95, to speed spotting or positioning for dumping. **(359)**

● Barber-Greene Model PS-70 portable screening plant is available in various sizes to suit every screening requirement. Consisting of a vibrating screen, portable belt conveyor, reciprocating feeder, and hopper or trap for feeding, the plant can be towed from job to job as a single unit, without disassembly. The screen is merely folded under the conveyor for travel.

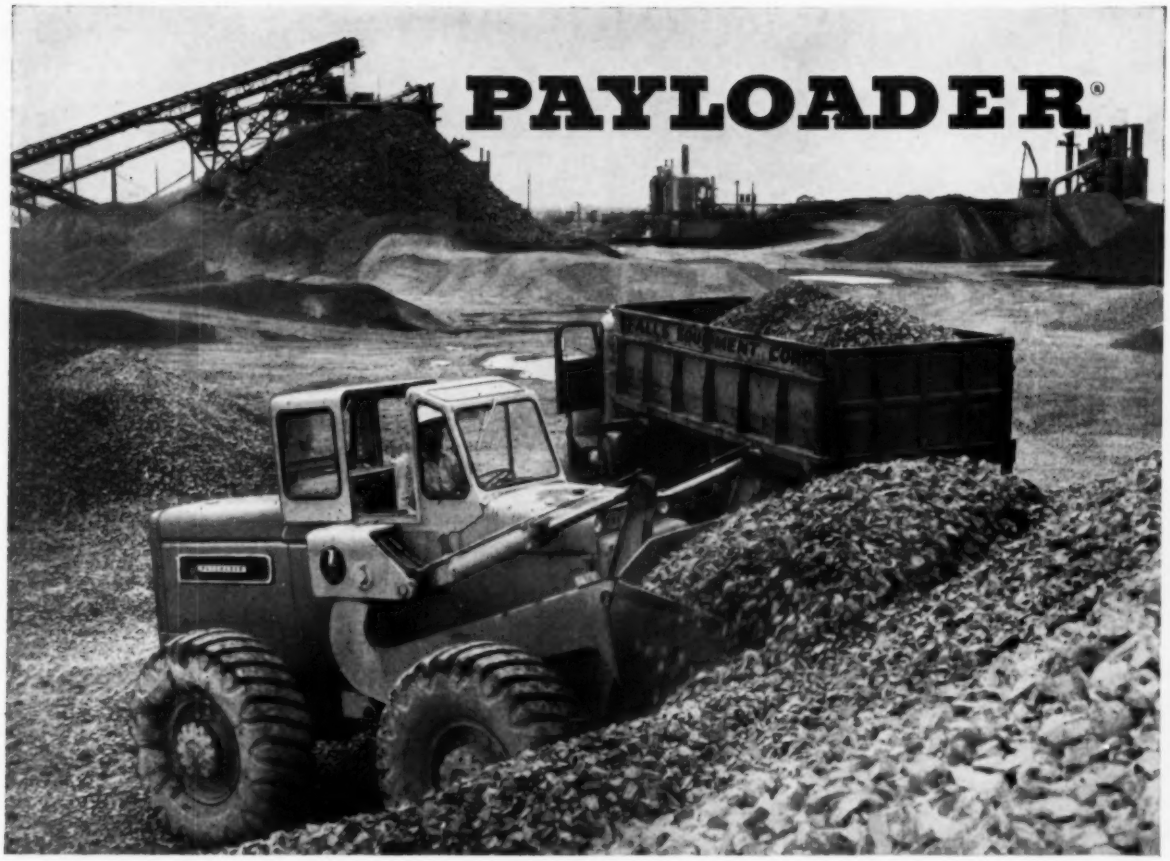
The plant screens while it loads, allowing the two operations to be performed simultaneously. A head pulley clutch located at the head end of the conveyor controls the feeder and conveyor, but allows the screen to operate continuously.

The newly-designed Barber-Greene screen supplied with the plant features double-loop spring suspension which allows full vibration with less spring resistance. Screen angle is adjustable to regulate capacity and accommodate various truck heights.

The portable conveyor has all-welded, rigidly braced steel side panels and bolted lateral bracing which give maximum strength for heavy loading. Sectionalized construction permits future lengthening or shortening in the field.

The reciprocating plate feeder is an integral part of the conveyor foot end, but is easily removed. Driven from the conveyor footshaft, it has a radial type gate which is easily adjusted for desired capacity. Automatic release allows rocks and boulders larger than the gate opening to pass through.

The heavy steel dozer trap readily bolts to the feeder frame, and is easily fed by a dozer blade. An all-welded steel plate hopper may be substituted for the dozer trap when the plant is to be fed by shovel, front end loader, or dragline. The hopper has ample capacity for continuous operation of the screening plant. Hopper extensions for even greater capacity are available. **(360)**



Loads 26 tons in 3¼ minutes

Aggregate producers are quick to recognize a material handling system that is both fast and economical.

At the Niagara Stone Division plant of Olsker McLain Industries, Inc., in Niagara Falls, New York, the entire stockpile operation is handled by a pair of "PAYLOADER" tractor-shovels, each with 9,000 lb. carry capacity. They handle about 50% of the ½ million tons of commercial crushed stone produced annually and the management is well pleased with their production records as well as their low upkeep.

During periods of peak production, the "PAYLOADER" units easily meet extra demands. Frequently one unit loads out in excess of 1,200 tons of crusher run stockpile material during 4½ hours of continuous operation — an average of 266 tons per hour. On several occasions the "PAYLOADER" has truck-loaded 26 tons of material in 3¼ minutes time.

The key to these profit-making production figures lies in the exclusive "balanced-design" of "PAYLOADER" tractor-shovels that provides maximum stability for all-around usefulness and material handling efficiency. These rugged loaders possess a tremendous breakout force and bucket tipback at ground level that enables them to get maximum loads and keep them during travel.

Four-wheel-drive, power-transfer differentials, and large pneumatic tires give them positive traction and flotation on any kind of footing. All have power-shift transmission, power brakes and power steering for easy handling.

There is a "PAYLOADER" size to fit the requirements in your plant too — up to 12,000 lb. carry capacity. Contact your Hough Distributor and let him match the efficiency of a "PAYLOADER" to your job.

NEW LITERATURE

. . . is available without obligation showing the complete "PAYLOADER" tractor-shovel line and the useful attachments available for each model.

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City _____ State _____

6-B-4

● Off-the-road haulers in 27- and 32-ton end dump models and an 80-ton bottom dump model comprise the new Haulpak line introduced by the LeTourneau-Westinghouse Company.

Air suspenion, no springs, and low center of gravity are features of the new models. To make servicing fast and simple, chassis grease fittings have been completely eliminated. Repair time is further simplified by easy accessibility and quick individual removal of major components without the need for removing other elements.

Automotive-type assemblies have either been eliminated altogether or replaced by tougher earthmover-type components. An example of this replacement is the use of the L-W power transfer differential in the Haulpak, which automatically transfers the bulk of the engine power from a slipping drive wheel to the one on the best footing.

The braking system of the Haulpak is described as being two systems co-ordinated and controlled by the standard brake pedal. When descending grades under load where retarding is desired, the operator presses the pedal lightly. The first stage of the pedal travel controls the Torqmatic retarder which is an integral part of the transmission. This slows the hauler instantly. When a full stop is desired, depression of the pedal into the second stage applies the multiple-disc air brakes, in addition to the retarder. These brakes, which provide from 4,680 to 5,148 sq. in. of stopping surface, are air-cooled and cleaned by filtered air under pressure from an independent compressor.

Twin hydraulic hoists raise the end dump body to 70 degrees for dumping full loads completely in 15 seconds. To keep wet, cold material from sticking to the body surface, an exhaust-heated body is standard equipment. Exhaust circulates through the hollow box section supports of the body, with outlets located at the extreme rear, away from the operator.

With a 130-in. wheelbase, the Haulpaks can turn completely around in a circle only 44½ ft. in diameter. Power steering and power brakes are standard equipment on all models.

The 27-ton Haulpak model is powered by a Cummins 335-hp. turbocharged engine and operates at speeds up to 35.4 m.p.h. With a Cummins 375-hp. turbocharged engine, the 32-ton model has speeds up to 38.8 m.p.h. The 80-ton coal hauler is powered by a Cummins V-12 450-hp. engine, and operates at speeds up to 40 m.p.h.

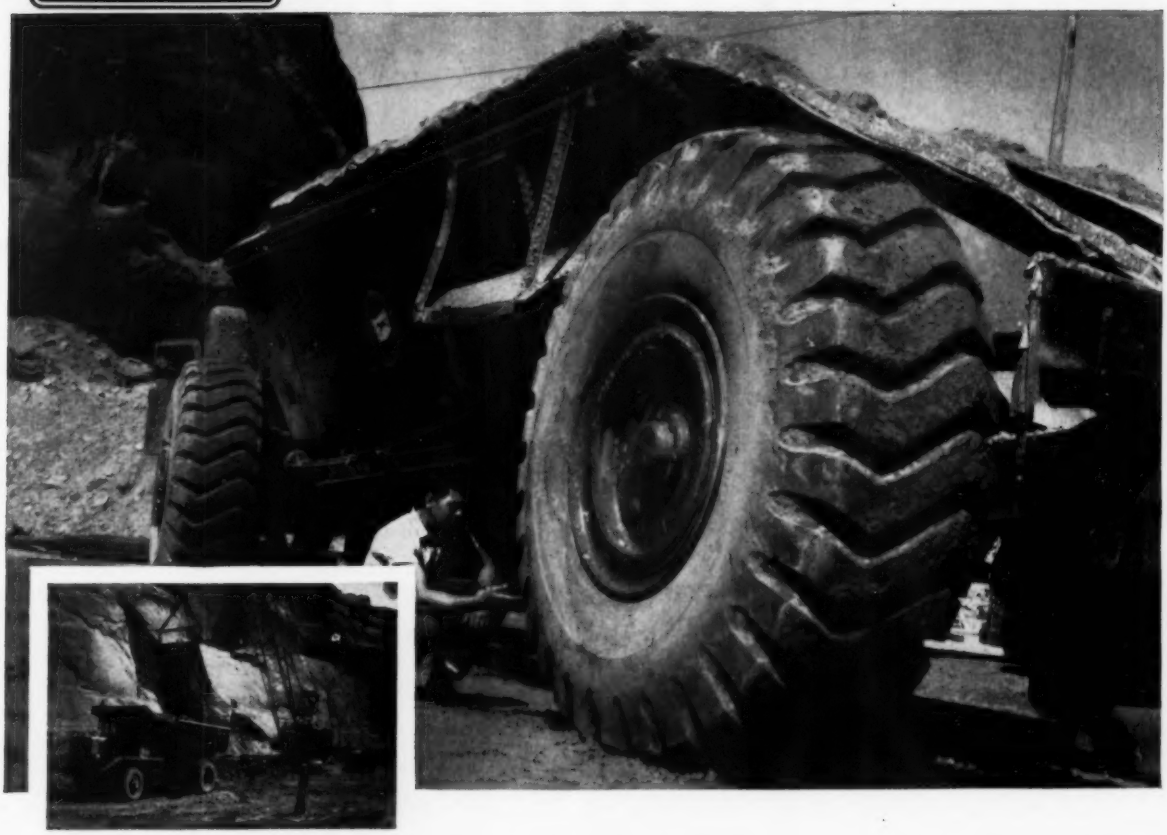
All three of these new dump models have torque converters which provide four forward ranges and two reverse. They incorporate automatic lock-up to eliminate torque converter slip and utilize maximum engine r.p.m. for higher truck speed. (361)

● A 105- to 120-bbl. capacity bulk haul tank-trailer, capable of pumping aerated powdered commodities a distance of 105 ft. or more, has been announced by the Fruehauf Trailer Company. Primarily designed for transporting bulk cement, the unit is equally suited for any material up to 120 lb. weight per cubic foot which will work on the Airslide discharge method. Airslide is a Fuller Company trademark.

Pneumatic unloading is accomplished with a blower mounted on the tractor and connected to the power take-off shaft. An optional discharge method, illustrated, is with the blower mounted on the rear of the pressure tank and activated by a gasoline driven engine.

Discharge rate of the Fruehauf pressure tank is 3.33 bbl. per minute through a 4-in. hose. At 11-lb. pressure, cement is pneumatically conveyed a distance of 20 ft. horizontally and 85 ft. vertically directly into a storage elevator. Discharge acceleration is manually controlled at the center outlet of the pressure trailer by a wheel-type valve. (362)

B.F.Goodrich



B.F.Goodrich tires help contractor speed rugged construction of Glen Canyon Dam

MIGHTY Glen Canyon Dam—world's third highest—will tower 700 feet above the bedrock of the Colorado River in northcentral Arizona. Before this massive project can be completed, millions of tons of rock, sandstone, aggregate and other materials must be moved over rocky haul roads.

To help keep this rugged job on schedule, Merritt-Chapman & Scott Corporation, general contractor, relies on B.F.Goodrich tires and service—uses 47 different types and sizes of tires on 23 different types of equipment that work 'round the clock. For example, M-C&S uses B.F.Goodrich Rock Service tires on belly dump trucks (above).

B.F.Goodrich builds the Rock Service for just this kind of work. Husky double-chevron cleats pull in forward or reverse, defy rock cuts and bruises. B.F.Goodrich FLEX-RITE NYLON cords withstand double the impact of ordinary cord materials, resist heat blowouts and flex breaks. Result: This B.F.Goodrich cord body outwears even the extra-thick tread, can be retreaded over and over.

Other B.F.Goodrich products at work at Glen Canyon include conveyor belting, air hose and fire hose. Special maintenance and service for tires and industrial products are also in operation—all part of the new B.F.Goodrich Unified Contractor Program. No matter what your off-the-road job, B.F.Goodrich is ready to serve you—and help you save. Your Smileage dealer is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Co., Akron 18, Ohio.*

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

B.F.Goodrich *off-the-road tires*

NOW! FOUR JALLOY

HEAT-TREATED, ABRASION-RESISTANT

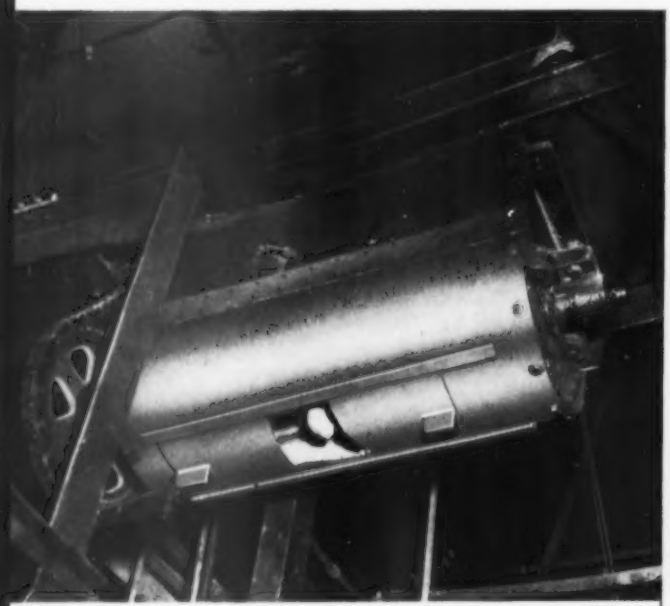
The new Jalloy series includes four types designated by suffix numbers,

JALLOY 280 **(Brinell range 260/300)**

Has excellent low temperature impact properties. Can be bent across the width (axis of bend at right angles to direction of rolling) on a brake press or on roll forming equipment. Where forming with the axis of bend parallel to the final rolling direction, Flange Quality can be supplied on application. Recommended minimum inside radius is 2t (t = plate thickness) up to ½" inclusive in thickness and 3t over ½" in thickness.

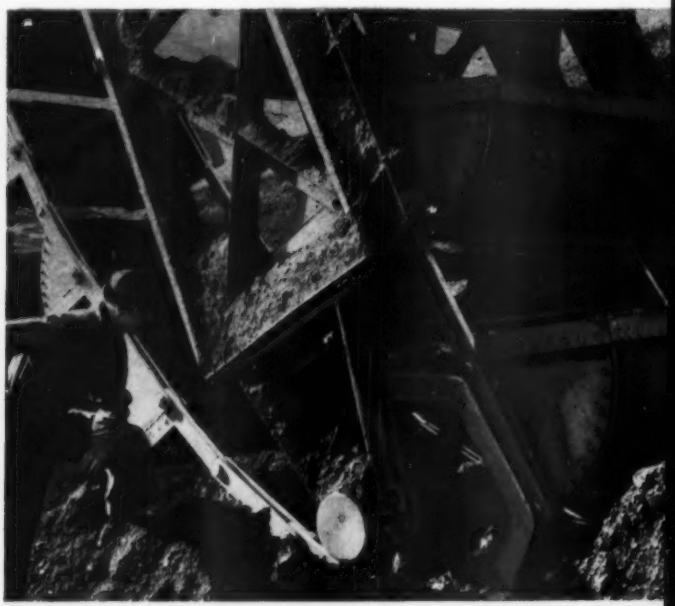
JALLOY 320 **(Brinell range 300/340)**

Has improved abrasion resistance over Jalloy-280. Can be bent across the width (axis of bend at right angles to direction of rolling) on a brake press or on roll forming equipment. Where forming with the axis of bend parallel to the final rolling direction, Flange Quality can be supplied on application. Recommended minimum inside radius is 3t (t = plate thickness) up to ½" inclusive in thickness and 4t over ½" in thickness.



JALLOY-280

In this cement agitator bottom saves time and money in maintenance. Jalloy offers low initial cost. And, it lasts six times longer than structural carbon steel.



JALLOY-320

Is used in these round-bottom scoops for its formability and abrasion resistance, which effect savings in manufacture and operation.

The JALLOY series will best meet your requirements for:

Abrasion resistance • Atmospheric corrosion resistance
Impact resistance • Forming properties

All at minimum cost to attain proven results

HARDNESS RANGES

PLATES FOR LONGER WEAR, LESS REPAIR

representing the mean of Brinell hardness range, and by color code for easy identification.

JALLOY 360 **(Brinell range 340/380)**

Has excellent abrasion-resistant properties. For best results in welding all Jalloy ranges, a low-hydrogen AWS Spec. E 100 XX Series is recommended. Preheating and postheating are not normally required but are sometimes used in special designs to avoid concentrated stress conditions. When preheating or postheating in those cases, a range of 200/400° F. is recommended.

JALLOY 400 **(Brinell range 380/420)**

To be used for flat applications. This type has maximum abrasion resistance. All Jalloy hardness ranges are furnished only in the heat-treated condition because the chemical composition of alloy steels alone does not provide the optimum physical properties. Uniformity of strength, hardness and toughness are achieved by close temperature controls during heat treating operations.

JALLOY-360

Jalloy-360 in the bottom, and Jalloy-400 in the runners, give this dump body resistance to the impact of loading, and the abrasion of dumping aggregate materials.

JALLOY-400

Lasts three times as long as mild steel in this particular application. Aprons in these screens are subjected to severe abrasion from sliding 1-inch granite.

Jones & Laughlin Steel Corporation
PITTSBURGH, PENNSYLVANIA

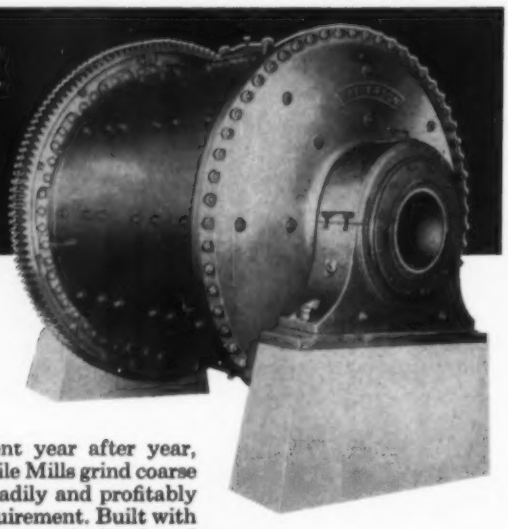
J&L STEEL

Enter 56 on card, page 155

Patterson –

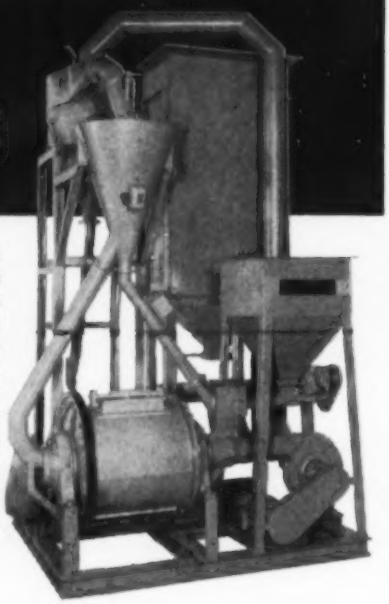
your one-word key to profitable grinding

in BALL, TUBE and ROD MILLS



Built to take punishment year after year, these heavy-duty, versatile Mills grind coarse or fine—wet or dry—steadily and profitably for every production requirement. Built with cast manganese or chrome-moly head and grate liners, these Mills are furnished with replaceable cast manganese, ni-hard or rolled steel shell sections, and can also be supplied with buhrstone, porcelain or high-density alumina linings. Let our engineers select the right mill for your grinding needs.

or COMPLETE GRINDING SYSTEMS



Patterson Systems are designed and built to fit your production demands —whether 50 lbs per hour or 50 tons per hour. Shown is our widely-used pilot plant system, with 2′ x 2′ continuous mill, pneumatic classifier, cyclone product collector, dust filter, feeder, feed bin, air supply blower and all necessary piping. The unit is mounted complete on a single base, requiring only an electrical connection. Let our laboratory grind samples of your materials—let our engineers consult with you. Write!

THE *Patterson* FOUNDRY AND MACHINE COMPANY

A Division of Ferro Corporation

East Liverpool, Ohio

THE *Patterson* FOUNDRY AND MACHINE CO. (CANADA) LTD.

Toronto, Ontario

Enter 58 on card, page 155

● Soon to be introduced as part of the 1960 Dodge truck line is this giant 5-ton NCT 1000 diesel tandem tractor, powered by a Cummins NH-220 engine. New diesel trucks with the NH-220 engine will offer a maximum gross combination weight rating of 76,800 lb., more than 15 percent greater than offered on present models. This g.v.w. of 76,800 lb. will enable the new trucks to carry virtually any commodity in over-the-highway operations in the highly specialized western states.

Diesel engines will be available this fall on three basic Dodge truck models with a gross vehicle weight range from 27,800 to 53,000 lb. and a gross combination weight range from 50,000 to 76,800 lb. **(363)**

● Maximum dust collection efficiency coupled with high portability are features claimed for the new mobile Standard cyclonic wet washer for asphalt hot mix plants made by the Standard Steel Corporation.

Especially designed for use on Standard's new high capacity Model S-E self-erecting asphalt plant, this mobile unit is ready to operate after connection of an inlet duct from the cyclonic wet washer and placement of a light stack extension. The wet washer is complete with spring-mounted wheel and axle assembly, jack legs, and air brakes. **(364)**

Keep your eye on 25-year-old Anthony Donatelli

...Cities Service customer on the move

One year ago, Anthony Donatelli, Jr. took over a small quarry. It wasn't much of a quarry then. Old hands didn't think much of its chances.

But today, with the barest minimum of equipment, it is producing over 900 tons of granite per month, under young Donatelli's management.

A recent veteran of the army, Donatelli has also displayed veteran judgment as a quarry operator during this first year of operation . . . judgment that is clear in his carefully drawn plans for expansion . . . judgment that shows in his selection of Cities Service Lubricants and reliance upon his Cities Service Lubrication Engineer.

It is too early to report any maintenance records yet, but it's not too early to predict success for Anthony Donatelli. For by his reliance upon the Cities Service Lubrication Engineer he has demonstrated an all-important management talent: recognition of the usefulness of experts in the various phases that comprise any business.

Why not put your lubrication problems in the hands of an expert, too. Get the benefit of the special knowledge and economies a Cities Service Lubrication Engineer can contribute to your quarry. Call the nearest office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

900 Tons of Rhode Island Pink granite are now produced each month by Harrisville Quarries, Inc., Donatelli's firm. The granite is used for monuments, veneer, and general stone work.

Trucks and All Engines are lubricated by Cities Service C-300 Motor Oil. Probably the most versatile lubricant made, C-300 has chalked up an astounding series of performance records with quarry and construction equipment.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Enter 59 on card, page 155

when the going gets rough-

give 'em "L"

When the bite is on the dragline, you'll be glad you rigged with *Leschen*—the wire rope that's the same top quality in every foot of every reel. The new Leschen wire mill is designed to deliver exactly that. New machines . . . new processes . . . exclusive new continuous-flow technique—all as modern as tomorrow. Try Leschen Red-Strand Wire Rope now and see how its uniform quality makes your operation safer, your replacement time farther in the future. Make your next order Leschen! *Leschen Wire Rope Division, H. K. Porter Company, Inc., St. Louis 12, Mo.*

LESCHEN WIRE PORTER ROPE DIVISION

H.K. PORTER COMPANY, INC.

DIVISIONS: Connors Steel, Delta-Star Electric, Disston, Forge & Fittings, Leschen Wire Rope, Mouldings, National Electric, Refractories, Riverside-Alloy Metal, Thermoid, Vulcan-Kidd Steel, H. K. Porter Company (Canada) Ltd.

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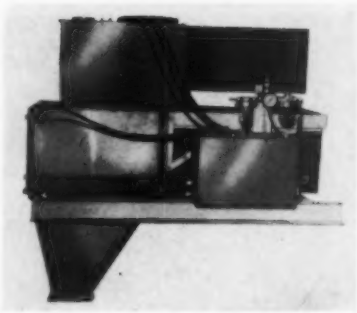
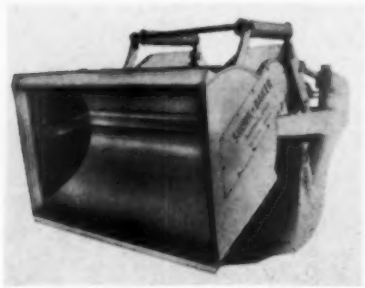


● A new filling scale for handling process clays with high flushing characteristics has been developed by the Thayer Scale Corporation. The fully automatic net weight filler and packer has a speed of six 100-lb. bags per minute and a capacity of 25 to 600 lb. It is available with single or double stage rotary feeders. **(365)**

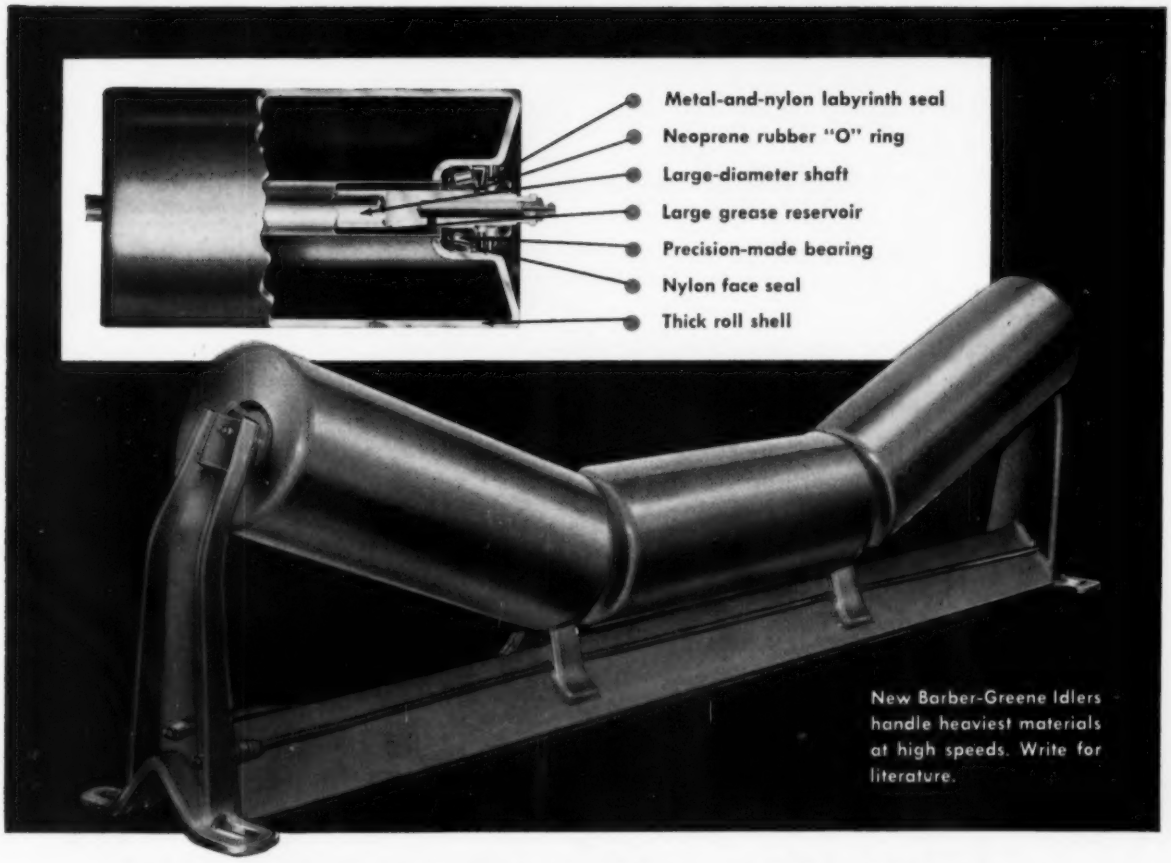
● Shunk Manufacturing Company has introduced a self-cleaning front loader bucket which operates on the principle of the ice cream scoop. It



is designed to increase yardage in handling kaolin, clay, and other sticky materials.

Called the Shunk-Baker self-cleaning bucket, the attachment is furnished in 1-, 1½-, 2-, and 2¼-cu. yd. capacities and is interchangeable with rear hinge buckets on wheel or crawler front end loaders.

The bucket's special alloy steel scraper blade is ⅝ in. thick and operates on steel bushings. As the bucket dumps, the blade scrapes sticky material from the bucket interior in the same way that ice cream is sliced from a dipper. The chain-driven scraper is spring-loaded and cannot be damaged by rocks or other hard objects. Actuating gear and drive chain is protected by flush-mounted cover plate and is easily accessible for tightening or adjustment. **(366)**


Metal-and-nylon labyrinth seal
Neoprene rubber "O" ring
Large-diameter shaft
Large grease reservoir
Precision-made bearing
Nylon face seal
Thick roll shell
New Barber-Greene Idlers handle heaviest materials at high speeds. Write for literature.

Increase idler life with these new heavy-duty Barber-Greenes

Barber-Greene's famous line of belt conveyor idlers has now been expanded to include two entirely new series of heavy-duty units. Both series offer many revolutionary design improvements that assure longer life on every job. Both are built to handle large lumps and heavy materials at high speeds. These new series include a complete range of types for every application.

Important advantages are:

Revolutionary grease seals—The combination labyrinth and face seals are the most advanced in the industry. Made of metal and nylon, they seal grease in . . . dust and dirt out, allowing long lubrication intervals and lengthening bearing life. Neoprene rubber "O" rings effectively prevent moisture from entering bearing.

Rugged end brackets—Die-formed carbon-steel end brackets, twice as strong as castings of the same thickness, are ribbed for greater rigidity.

Precision-made bearings—Tapered roller bearings are precision-made to give many thousand hours of service.

Large-diameter shafts—Shafts, made of special-accuracy cold-drawn steel, up to 1¼" in diameter. They are firmly anchored in stands by sturdy clamps and locking plates.

Virtually unbreakable stands—Jig-welded, all-steel stands maintain roll alignment despite the impact of large lumps. Heavy, inverted base angle is self-shedding. Heavy, formed steel feet up to ½" thick.

Thick roll shells—Rolls made of heavy steel tubing up to ¼" thick. Strong welds completely around roll ends assure rugged, long-life units. Roll edges ground smooth to prevent belt wear.

Large grease reservoirs—Rigidly fitted seamless steel tubing forms large grease reservoir, providing ample reserve which permits longer lubrication intervals.

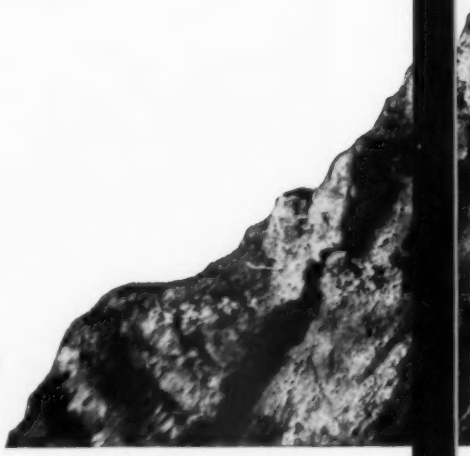
59-9-1PE

Write for new bulletin.

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

"We've used International TD-24's on our job continuously for three years," reports Bobby Ikerd, for Ikerd and Bandy, Inc., Manchester, Ky. "Our first '24' has worked over 8,000 hours. We get good production with exceptionally long track life. Live track turning, planetary steering features, combined with hydraulic dozer, gives us a faster stripping operation in mountain terrain—plus operator safety advantages." Their 24's strip 30-foot earth-shale-rock overburden on 100-foot maximum push. Right: One of their "24's" rolling up production!



PLANET POWERED "24's"

hit stripping cost squeeze...with

"Planetary steering enables the TD-24 operator to cut more high-wall yardage per day, as live power on both tracks pulls out full dozer blades on a continuous move," declares Supt. Ken Ellis, Ford Mining Co., Charleston, W. Va. "The decelerator offers better tractor control. Our older TD-24 still has the same track system after 7,000 hours of work. Service like this sold us on our new '24'." To support a coal-augering operation, their TD-24, shown, faces up to 300 lineal feet of bench daily, cutting a maximum depth highwall of 30 feet, in hard shale and sandstone.

"Our year-old '24,' stripping overburden, and working in mud, sand, and gravel along the creek bed, keeps well ahead of the dragline," states Supt. C. G. Hendry, for Dallas Sand and Gravel Co., Inc., Selma, Ala. "Our TD-24 track life (they've owned three '24's') runs a good one-third longer than competitive crawler owners are getting around here." The company produces fluxing gravel, road rock, pea gravel, and sand for industrial and construction uses.

"live" track steering...long track life!

"The TD-24 planetary steering design combined with the torque-converter has greatly reduced tractor maintenance in our type of operation," reports R. D. Baughman Coal Company, Brookville, Pa. "Live power on both tracks enables the operator to push larger loads, always keeping the dirt rolling regardless of terrain conditions. My operators especially like TD-24 ease of control." The Baughman Company strips up to 40 feet of shale, sand rock, and clay overburden from a 5-foot seam of coal.

See what's behind TD-24 ability to outdoze same-sized competitors, as much as 50%—and to give up to one-third greater track life than other makes, especially in tough conditions! See how exclusive Planet Power steering keeps paydirt on the move—doesn't spill your "extra profit" margin—eliminates "dead-track drag" in turns. Prove what it means to increase stripping production efficiency and cut upkeep with "24" capacity. See your International Construction Equipment Distributor for a demonstration.

International® Construction Equipment

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

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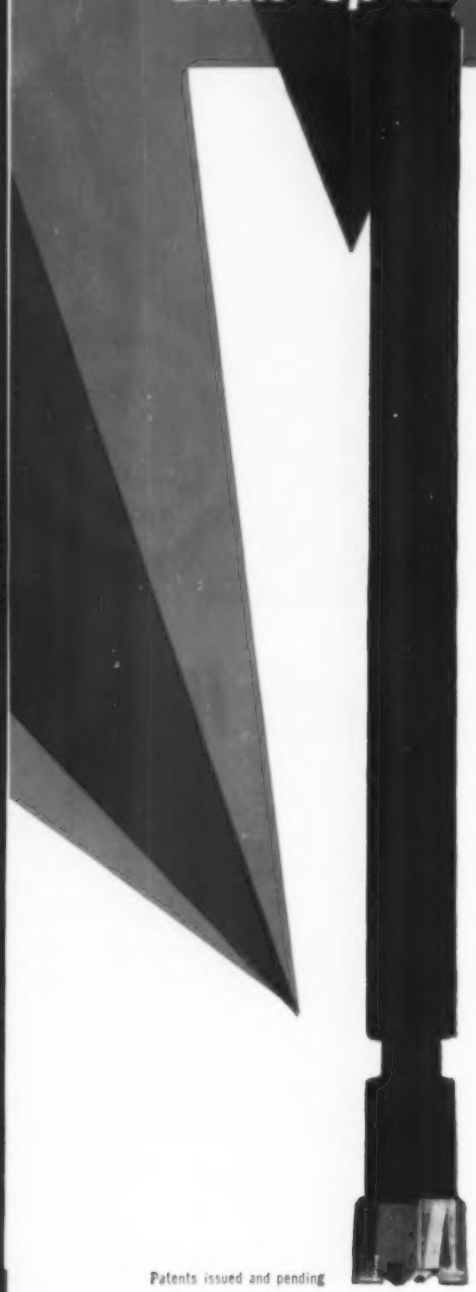
Drills up to 30 feet an hour in granite

MISSION HAMMERDRIL

Trade Mark

Bottom Hole Impact Tool



Patents issued and pending

The Mission HAMMERBIT

Here's the economical answer to high speed drilling in hard rock. The HAMMERDRIL® is economical because of its design—only two moving parts in the high pressure tool, and only three moving parts in the low pressure tool. Economical because impact parts are heat-treated high alloy steel, moving parts are friction and wear resistant. Economical because you can use it on your present rotary rig with suitable air compressor capacity. Mission HAMMERBITS® feature massive tungsten carbide inserts which can be *resharpened in the field.* The HAMMERDRIL with the HAMMERBIT cuts the cost per foot of drilling every foot through hard rock.

The Mission HAMMERDRIL is sold and serviced throughout the United States. Write to Mission for more information on what the HAMMERDRIL can save you—actual field savings under field conditions.

Nothing but the finest will bear the name of MISSION MANUFACTURING CO

Serving the Petroleum Industry for Over Thirty Years

59-500

MISSION MANUFACTURING CO., P. O. Box 4209, Houston, Texas • Cable Address—"Missco" • Export Office: 30 Rockefeller Plaza, New York
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Pistons • Piston Rods • Slips • Gland Packings • Liners • Liner Packing • Pump Valves and Seats • Swabs • Valves • Hammerdrils • Centrifugal Pumps

Labor Developments

(*From p. 13*)

this focal point is almost sure to be enacted.

This, then, is now becoming the real issue in steel. Clearly, the point has been firmly made that steel workers are not underprivileged. Their wages are relatively high in comparison with other workers. Their protection against unemployment, illness, old age, and death are also relatively good. To be sure, all these measures could be improved.

However, the issue now is not whether they should be improved, but rather *what price the rest of the nation should pay for their improvement*. If the price is another round of price increases, the benefits to the relativtly few may not be worth the cost to the many. If this fact becomes obvious, then the many have the power, through government controls, to prevent the action. This year's steel negotiations could make this issue painfully obvious. To prevent this from happening is the one point on which the union's and the company's interests are identical.

Washington News Letter

(*From p. 11*)

should be engaged in only in real emergencies, such as the 1957-58 recession, when the Federal Government helped the states extend unemployment insurance payments. He would probably be equally diligent in breaking up restrictive practices but more willing to include the activities of trade unions in his campaign.

The most significant difference is the last. Mr. Saulnier would be more likely to resolve narrow questions of economic policy in favor of avoiding inflation, perhaps even at the risk of creating some otherwise avoidable unemployment. He takes this position because, in his view, an essential element in economic growth is stability, particularly price stability. It is the view of the present administration that stable prices are essential if businessmen are to be able to plan successfully for expansion.

The Administration appears to be convinced that inflation, even of a moderate degree—such as 2 percent a year—is an inhibiting force on business plans, and Mr. Saulnier takes no exception to this proposition. Although this view is firmly held, the evidence on which it is based is scanty indeed.

Entering the debate from time to time and always hovering over it are the well-known opinions of the eminent Harvard economist, Sumner Slichter, who, with apparently very little more objective evidence, holds to the opposite view, namely that, under our economic system, a modicum of inflation is required to assure economic growth. It is his view that the lure of higher dollar profits is essential to get businessmen to expand. He contends that while the profits may be illusory, they are essential.

Apparently, the net effect of the tugging and hauling between the Keyserling and Saulnier views is a result approximating the Slichtner analysis. It is particularly significant that these rather difficult economic problems are being debated actively—not because the debate will resolve the issue, but rather, because while the debate proceeds, continuous attention is being given to our economic situation.

Vancouver Pozzolan Deposit Discovered in Alberni District

Discovery of pozzolan in a rare volcanic shale is expected to lead to a new industry on Vancouver Island, B. C. Holdfast Natural Resources Ltd., a British Columbia company, has been set up to develop the deposit, build a plant at the site, and manufacture and market the product.

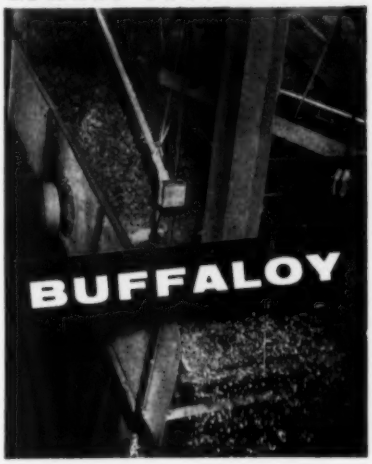
The find is a material which can be processed into a highgrade pozzolan.

The pozzolan bed, discovered in the Alberni district in the central area of Vancouver Island, is estimated to contain reserves totalling 100,000,000 tons.

Tests at the University of Washington showed the Alberni shale to be a good grade of light aggregate. In further tests, Wolf G. Bauer, a Seattle consulting engineer, discovered its pozzolan value.

A 100-t. p. d. plant is planned, with provision for expansion. The operation involves open-pit quarrying, crushing, and pyro-processing.

LONGEST SERVICE AT LOWEST COST PER TON



anti-abrasive wire cloth

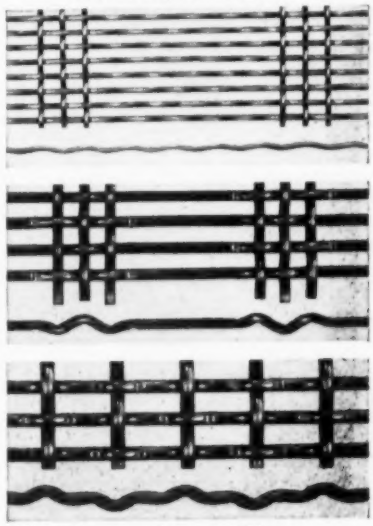
Here's the toughest mineral aggregate screen in the business . . . outperforming and outlasting screens that cost appreciably more. Specially processed for greatest resistance to wear, Buffaloy has both the hardness to hold up under severe abrasives and the flexibility to shrug off heavy shock loads.

Count on Buffaloy for many extra hours of service and substantial savings in your screening operations. Vastly superior to other high carbon wire screens, it is made in two grades:
Regular . . . for average conditions.
Super . . . . for highly abrasive materials.

Now available in an extra wide selection of weaves, mesh sizes and gauges — either as flat pieces or vibrator screen panels with special edges — Buffaloy can answer your every sizing need.

Get the complete story on Buffaloy and what it can do for you. Write for New Bulletin 600P.

BUFFALO WIRE WORKS COMPANY, INC.
526 Terrace, Buffalo 2, N. Y.



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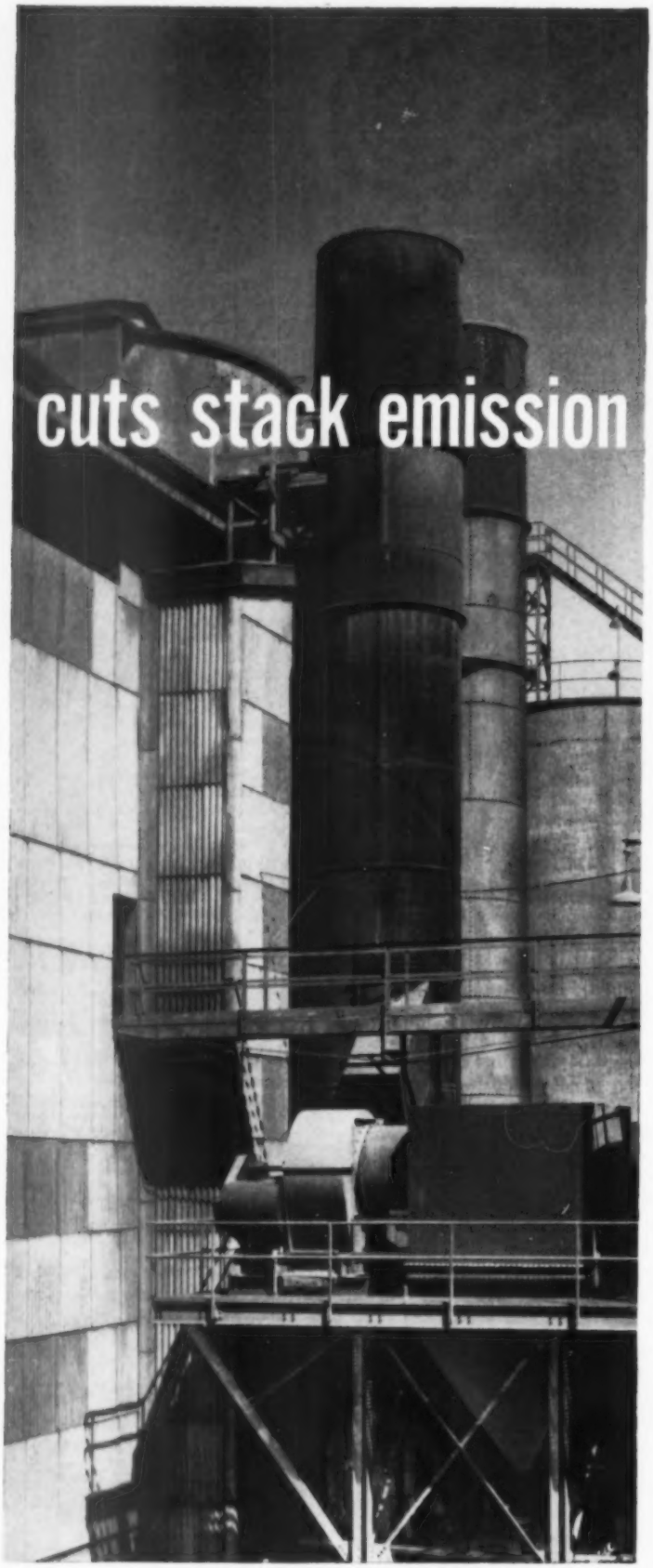

Hagan Dust Collector proves 96.5% efficient

on clinker cooler at Dragon Cement Company

One of two 173 tube units recently installed at the Dragon Cement Company, Northampton, Pa., this Hagan Dust Collector passed ASME Power Test Code No. 21 with flying colors. The test was conducted to determine efficiency and to show compliance with requirements of Lehigh Valley Air Pollution Control. Conducted to the satisfaction of R. Emmet Doherty, Director of LVAPC, results indicated that the Hagan Dust Collector, handling 38,000 cfm at 490F, was operating at the highly satisfactory efficiency of 96.5%.

Local codes demand a stack emission of not more than 0.25 grains per cubic foot. The Hagan Dust Collector is holding stack emission to 0.0437 *grains per cubic foot, less than one-fifth of the permitted total.*

The two collectors recover more than 9500 pounds of cement dust every 24 hours. This is returned to process, so that not only is a local dust nuisance ended, but valuable product is salvaged.

Hagan Collectors have proved their efficiency in a variety of jobs, such as:

- **Stone Dryers**
- **Slag Dryers**
- **Coal Dryers**
- **Boiler Fly Ash**
- **Stone Crushers**
- **Cement Kilns**

plus many other air pollution control and product recovery applications.

Put this economical Collector to work in your plant. Ask a Hagan engineer to explain how the Hagan Collector can save you money in your plant, or write for Bulletin MSP-124A.

HAGAN CHEMICALS & CONTROLS, INC.

DIVISIONS: CALGON COMPANY, HALL LABORATORIES

HAGAN BUILDING, PITTSBURGH 30, PA.

In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Flumendosa No. 13, Milano, Italy

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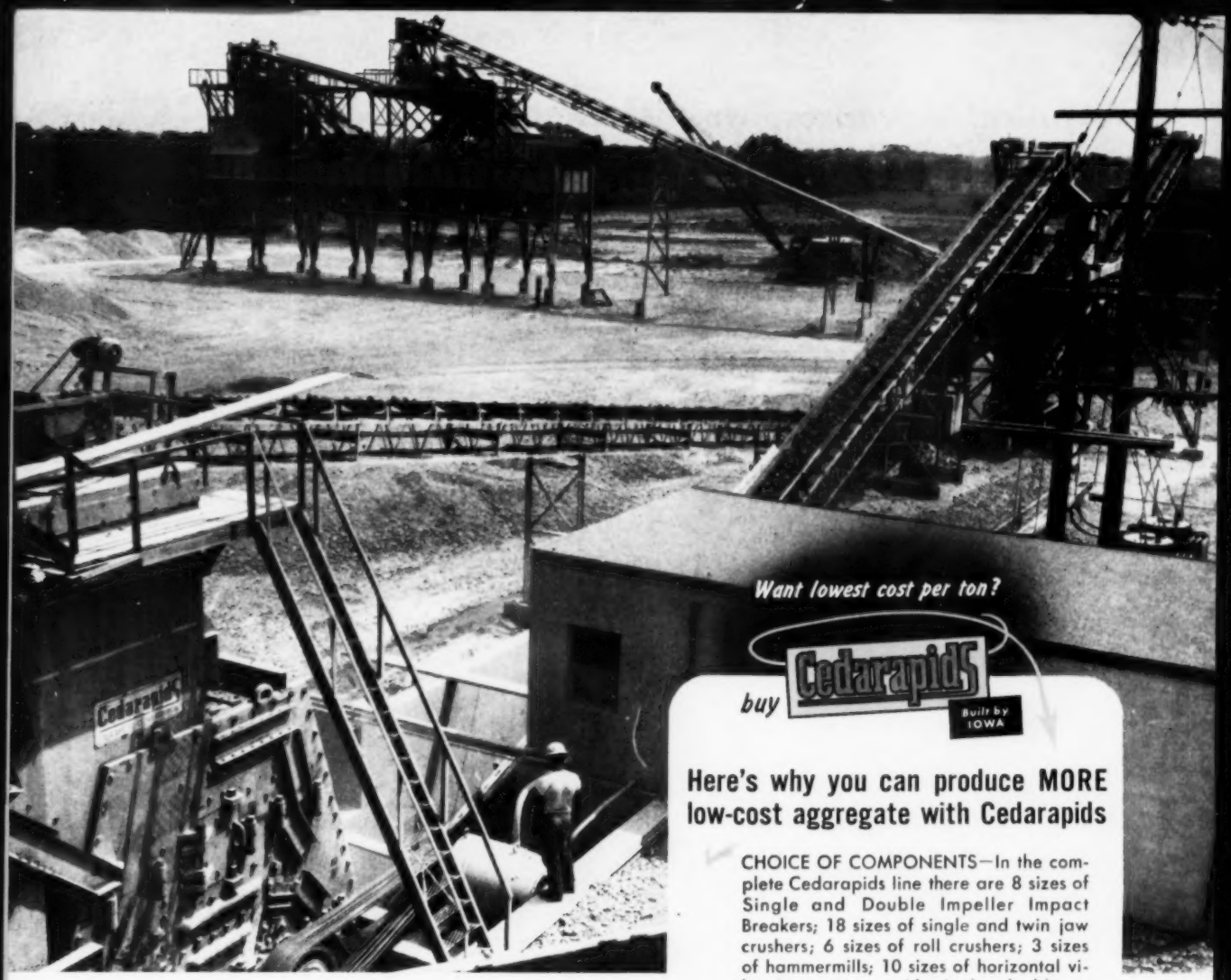


Want lowest cost per ton?

buy Cedarapids — Built by IOWA

Here's why you can produce MORE low-cost aggregate with Cedarapids

CHOICE OF COMPONENTS—In the complete Cedarapids line there are 8 sizes of Single and Double Impeller Impact Breakers; 18 sizes of single and twin jaw crushers; 6 sizes of roll crushers; 3 sizes of hammermills; 10 sizes of horizontal vibrating screens, with single, double or triple decks.

CAPACITY-BOOSTING AUXILIARY EQUIPMENT—Vibrating grizzlies; washing plants; washing attachments; feeders; conveyors; bins.

BALANCED PRODUCTION—Each Cedarapids component you need is recommended not only as to the type that best handles your quarry conditions, but also to match every other component in the plant for balanced output. Only Cedarapids has the complete line of components to make this possible!

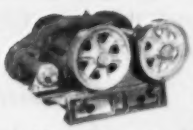
SKILLED ENGINEERING—Cedarapids engineers have been analysing and solving problems similar to yours for 36 years. Put their production-wise experience to work for you *now!*

Cedarapids "tailors" each stationary plant to each job requirement

Your aggregate producing problem is different from any other in the world. That's why Cedarapids maintains a special engineering department to "tailor" your stationary plant to your particular job for the most profitable production. Take advantage of Cedarapids engineers' field experience, their intimate knowledge of rock and salable rock products, their skill in combining the right components to give you extra tons per hour while saving money on lower maintenance and reduced operating costs. Call in a Cedarapids engineer *before* you plan your plant. Ask your Cedarapids Dealer for details.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

THE RIGHT COMPONENTS, PRODUCTION BALANCED FOR EACH JOB, ASSURE HIGHER PROFIT . . .



Twin-Jaw Crushers, exclusive with Cedarapids, increase crushing capacity from 40% to 100% over comparble-size single jaw crushers.

Cedarapids Roll Crushers assure high capacities of small sized aggregate at lowest cost per ton.

Cedarapids Horizontal Vibrating Screens have 12% greater screening area than same-length inclined screens; give 20 to 30% more effective gradation.

Technical Advances, New Markets Discussed at Vermiculite Meeting

NEW market opportunities for vermiculite products and reports on technical advances highlighted the 18th annual meeting of the Vermiculite Institute of Chicago, held April 4 through 9 at Boca Raton, Fla. From all indications, 1959 will prove a banner year.

W. V. Culver, secretary-manager of Vermiculite-Northwest, Inc., at Seattle, Wash., was elected president

W. V. Culver

to succeed J. Brooks Robinson of Great Falls, Mont. Three new directors were named: Jack Lyall, president and general manager of Southwest Vermiculite Company, Albuquerque, N. M., R. W. Sterrett, vice-president of Zonolite Company, Chicago, and L. J. Venard, president, Western Mineral Products Company, Minneapolis, Minn.

Edward R. Murphy and Walter J. Bein will continue as managing director and treasurer, respectively.

L. G. McDiarmaid, chairman of the market development committee, reported that sales of vermiculite acoustical plastic during 1958 increased over 1957, an all-time high. Sales of fill insulation were also higher.

In the limelight was a new product —vermiculite masonry fill for block and cavity walls, the result of 10 years of research. The fill is made water-repellent by a patented spraying process that coats the granules with a waterproofing compound.

The product has passed the severe test developed by the National Bureau of Standards as set forth in BMS Report 82.

Clayford T. Grimm, assistant director of engineering and technology for the Structural Clay Products Institute, Washington, D. C., stated that the new treated fill has been approved by S.C.P.I., and discussed its market possibilities. J. A. Kelley, president of Zonolite Co., told the convention that the new product is the low-cost solution to insulating walls where moisture or condensation may be a problem.

From an insulation standpoint, tests of twin constructions (one with masonry fill and one without insulation) showed that the new fill reduces heat loss by as much as 60 percent, Mr. Kelley said. Another

Walter W. Underwood

advantage is that the insulated wall will take an 11 to 13 percent humidity increase in the basement before condensation will occur, he added.

The guest speaker, Walter W. Underwood, executive director of the National Concrete Masonry Association, Chicago, welcomed vermiculite masonry fill as an aid in the industry's current campaign to obtain a larger share of the market. With his slide presentation depicting new decorative effects in concrete block walls, Mr. Underwood commented:

"Block has emerged in the last few years as one of the most dramatic, most beautiful, and most versatile of building materials. We expect this new glamour to join hands with the already broad acceptance of block for structural purposes, and substantially increase the overall use. We invite the vermiculite industry to work with us in developing the market."

Harry B. Zackrison, chief, engineering division, Army Corps of Engineers, Washington, D. C., also expressed interest in treated vermiculite for the cavity walls.

The market for vermiculite acoustical plastic in prestressed concrete construction was discussed by C. A. Pratt, vice-president of Western Mineral Products Company, Minneapolis, Minn.

"The matter of fire ratings is probably the most pressing problem facing the prestressed concrete industry today," he said. "Two-hour and better fire ratings were formerly granted concrete construction if the reinforcing steel had a cover of ¾ in. of concrete. In recent years, however, the fire ratings for concrete construction are being studied and revised. Prestressed concrete, being new, is subject to proof of fire resistance. One prestressed unit with the minimum cover of 2 in. for all reinforcing steel recently passed the two-hour test at Underwriters' Laboratories except for heat transmission through the center of the slab. It was approved with the provision that 3 in. of structural concrete or its equivalent in resistance to heat transmission be applied over the top.

"In order to qualify for a two-hour rating," Mr. Pratt stated, "the prestressed manufacturer has the alternative of beefing up his section, making it more expensive and difficult to handle, or adding fire protection such as vermiculite acoustic. Unquestionably, all existing prestressed sections could be made to qualify for a two-, three-, or even a four-hour rating by the simple addition of vermiculite acoustic to the under side. This has been demonstrated by the work done in qualify-

(*Continued on page 91*)

Enter 69 on card, page 155 →

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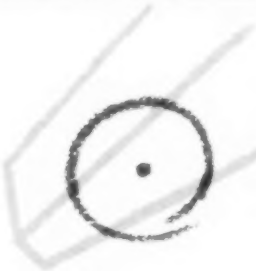

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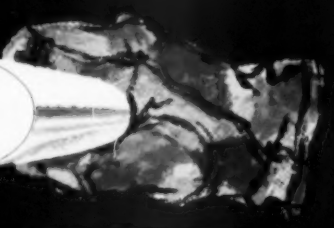

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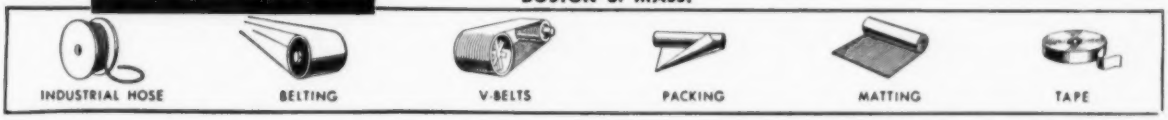

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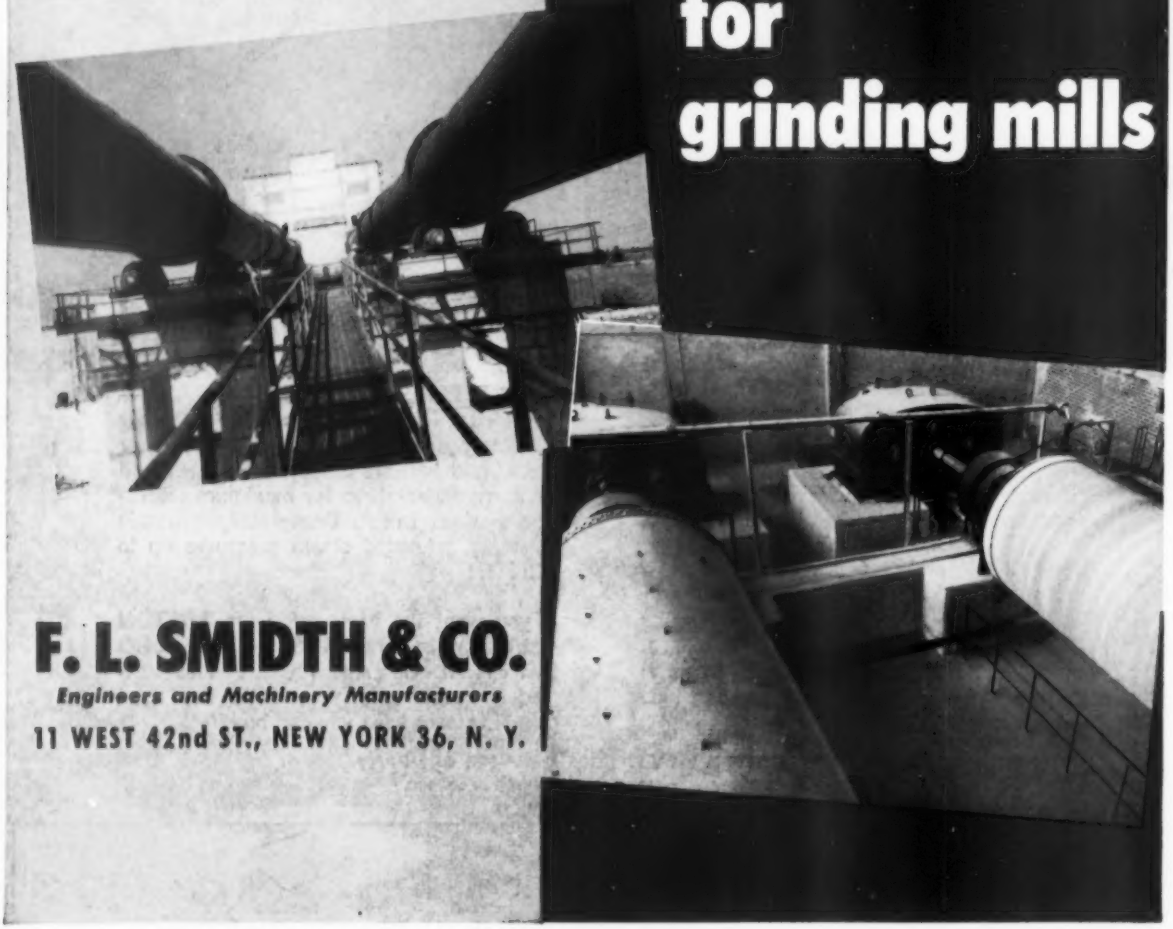

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Calcium vs. Fallout

IN SPITE of the varying reports from different authoritative sources on the extent of contamination of foods from radioactive fallout, there seems to be no doubt that this is a serious threat to human health and well-being. If it is not one now, it surely will become a threat if atomic explosions continue.

At the public hearings held May 5 to 8 by the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy an impressive array of scientists told what has been learned since the last hearings in 1957. There was much difference of opinion on various phases of the subject, but it was agreed that the rate of fallout is much faster than was originally estimated, and that it is heaviest over the northern hemisphere. There were no clear-cut decisions concerning the status of calcium, its use, and its effect, in preventing the absorption by plants of strontium-90; but there was much evidence that it is helpful.

The National Agricultural Limestone Institute was one of the first to publicize the use of calcium for this purpose but it has proceeded cautiously because of the lack of conclusive information and the lack of agreement among scientists. It is now felt, however, that the recent hearings have clearly established that acid soils have a higher content of strontium-90. This fact, with the other benefits accruing from the use of calcium on the soil, is held to make imperative the increased use of calcium required for sound farming practice.

IT HAS been clearly proved that the strontium-90 content in the bones of sheep which had grazed on a calcium-deficient pasture was twice that of sheep which had grazed on pastures treated with agricultural limestone. Contamination of milk is also widespread and increasing. That this is not our problem alone is evident from a recent report in a Polish scientific journal, which stated that tobacco plants take in excessive amounts of carbon-14 from the air, and that smoking carries this radioactive element into the lungs, causing the cancer commonly blamed on heavy cigarette smoking.

Evidence indicates that in a humid area the rate of contamination can be definitely slowed down, in one test as much as 60 percent, by the application of calcium until the pH of the soil reaches 6.8. It has also been shown that with neutralized soils, the rate of strontium-90 uptake is not affected by adding more calcium.

IT IS not yet known how much tolerance human beings have for strontium-90. It is known that the absorption of this contaminant does make people more susceptible to various forms of cancer, and there is good reason to believe that there are other harmful effects. This makes it obvious that no effective means of combatting the harmful effects of fallout should be ignored. We agree with the N.A.L.I. that the very probable benefit to national health, plus the known agricultural benefits, makes it imperative that this subject be given more study and that our farms be brought up to their peak fertility by the application of agricultural limestone.

Walter E. Trauffer

Aggregates for

2,000-t.p.h. dual-flow crushed stone operation of Channel Constructors at heart of immense hydro-electric construction project

ANOTHER ON THE SPOT REPORT

ENORMOUS? This term would inadequately describe even the individual factors in the Niagara Power Project—a hydro-electric installation considered to be one of the greatest such developments ever undertaken. An estimated construction cost of nearly $3/4 billion, power plants with a combined kw. capacity equal to the power consumption of 2,500,000 average homes, nearly three miles of underground concrete water conduits over 3,000 sq. ft. in cross section—these are some of the elements in the tremendous picture.

Breathtaking though it is, the construction of this engineering complex is completely dependent upon the most basic factor—aggregates. The critical importance of these materials in terms of adequate, steady supply, produced to meet rigid specifications, was fully recognized by the Power Authority of the State of New York when that body detailed the particulars to be incorporated in an aggregate production facility.

This quarry area will become the forebay of the pump generating plant; it is the eastern end of an open canal that will lead to the main generating plant. The huge concrete intake conduits will terminate at a point in the right background of this photo, and the pump generating plant will be at the far left.

Impressive as is the overall project which it serves, the 2,200-t.p.h. aggregate plant alone—described as the largest such operation in the world—is one of the outstanding components in the vast Niagara project. Built by Channel Constructors, a joint-venture organization comprised of Peter Kiewit Sons (sponsor), Morrison-Knudsen, Perini Corporation, and Walsh Construction, the plant went into full operation early this year. It will deliver approximately 10,000,000 tons of aggregates, from 6-in. down to sand, for the 3,300,000 cu. yd. of concrete required in power station, waterway, and reservoir construction. All other contractors on the project, as well as Channel Constructors, who are building the reservoir dikes and a section of the waterways, will also be served by this facility.

Development

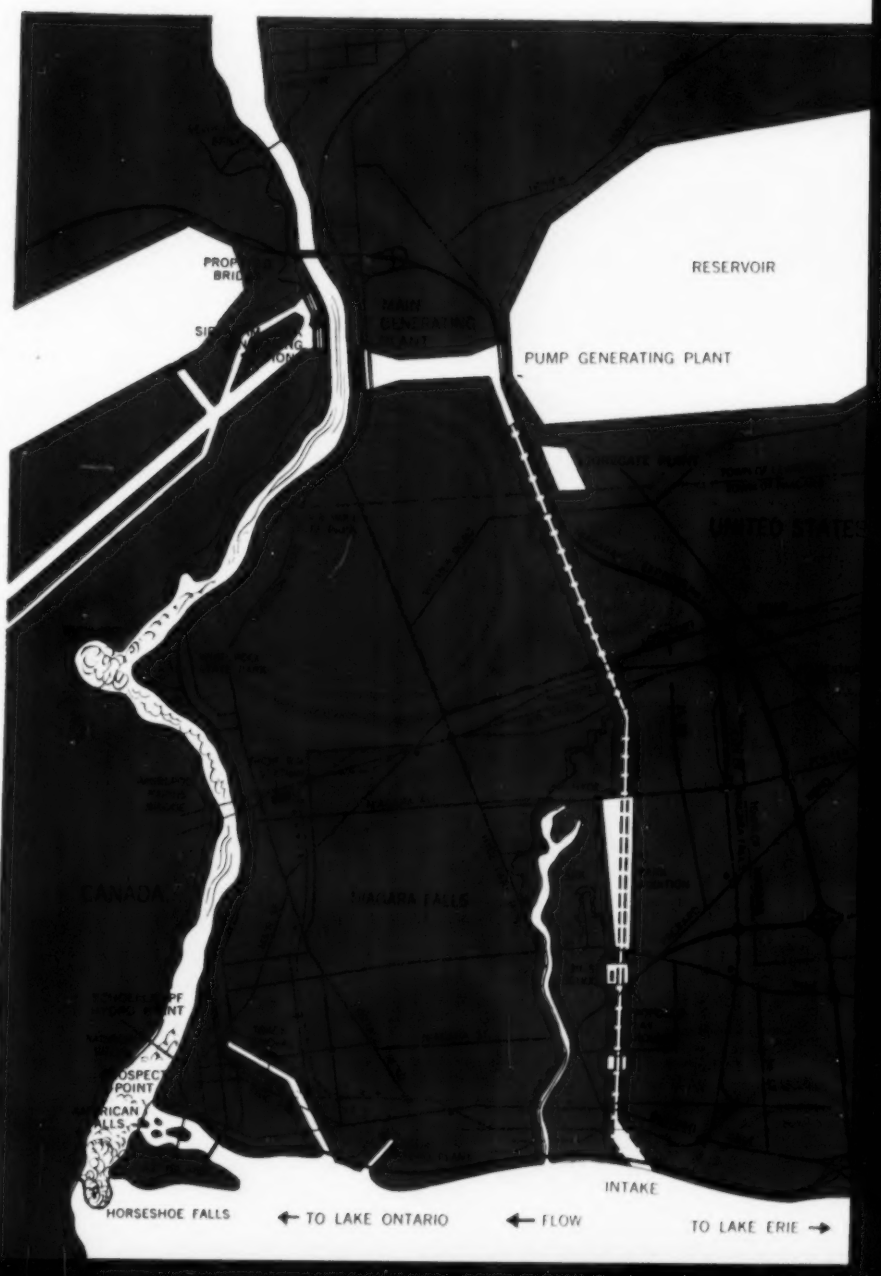
Plant Specifications As established by the Power Authority, specifications on plant production and product delivery dictated that the facility incorporate certain physical features.

At full production, the plant was to have a capacity of at least 320,000 tons of crushed stone (in four specified gradings), and at least 140,000 tons of sand (one grading) per month. Further, at least three reclaiming tunnels under each grade of stone and the sand were specified, and all were to terminate at separate truck-loading stations. Each of the

Niagara Power—

By BUREN C. HEROD

Channel Constructors are at work in an area of tremendous construction activity. At completion, the aggregate plant site will be landscaped as a part of a large park near the reservoir and pump generating plant.

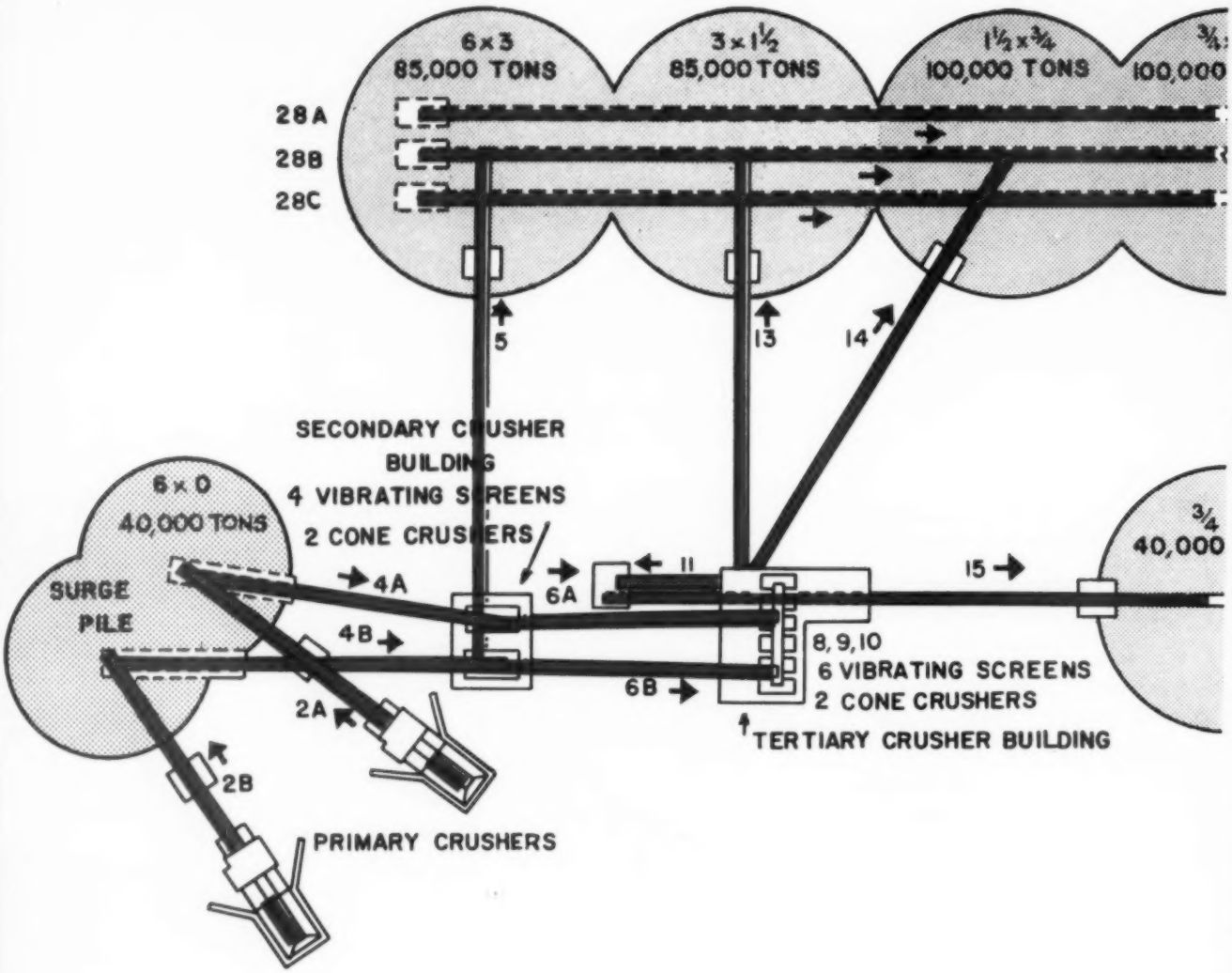


latter was to be equipped with a rinsing and dewatering screen and a finishing screen; and each station was to be capable of loading any one of the grades of material at the rate of at least 20 t.p.h.

Provision was also to be made for sand to by-pass the rinsing and finish screens. In the event that sand plant operations were not conducted during the winter, this phase was to have sufficient capacity to produce at least 1,680,000 tons of sand during the operating months; and stockpiles were to assure the availability of at least 140,000 tons of sand each month that the plant was shut down.

Design and Construction Engineering and design of this imposing aggregate plant—a project that required nearly 1,000 engineering and steel detail drawings—was awarded by Channel Constructors to John F. Meissner Engineers, Inc., Chicago. It was designed to provide two independent production units from primary through tertiary reduction. (At such time as monthly construction requirements have dropped to the point where one production unit can handle demand, Channel Constructors can dismantle and remove the other.)

Each of the A and B lines has a capacity of 1,100 t.p.h. In addition, the overall production flow is separated into three phases—primary crushing (dual), secondary and tertiary crushing (dual), and



sand plant—with surge piles between the phases. (See accompanying site plan.) Separation of these phases allows a flexibility in operating periods and production rates to parallel material demands at any level up to maximum capacity.

Product reclaiming, rescreening, and shipping facilities—as specified—involve three separate and parallel stockpile reclaiming tunnels housing 600-t.p.h. conveyors, and three individual rescreening and loading bin structures.

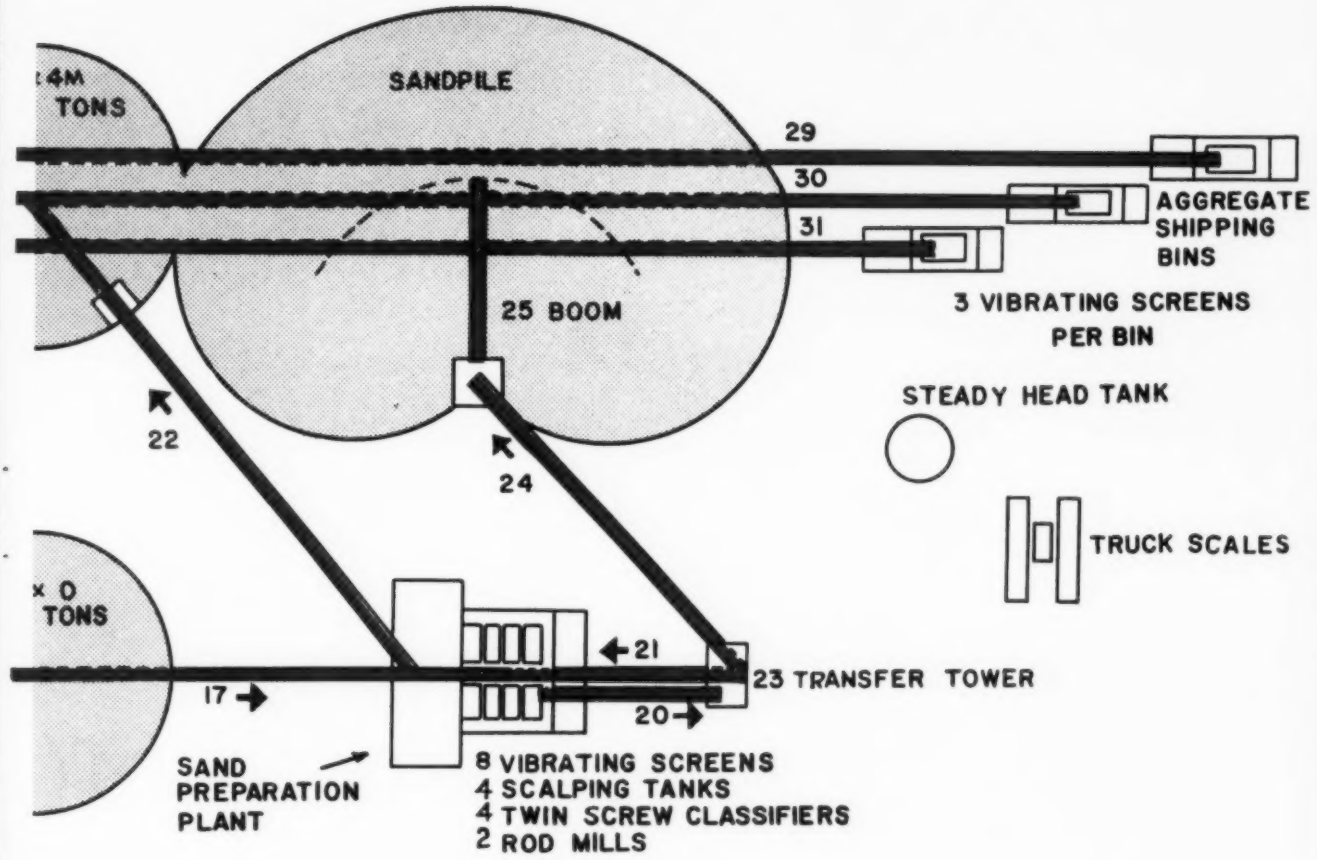
Although obscured somewhat by the vastness of the overall project which the aggregate plant supplies, the quantity of materials involved in its construction are in themselves impressive. Excavation for foundations required the removal of 29,000 cu. yd. of material. Construction of dikes for the tailings pond area necessitated placing 97,000 cu. yd. of fill, and 186,000 cu. yd. of broken stone were used in building a truck ramp at the primary crusher installation. Nearly 11,000 cu. yd. of concrete was poured for footings, piers, and foundations, and more than 2,400 tons of rebars and structural steel were employed. For chute work, 276 tons of steel plates were used.

Close co-ordination and tight scheduling of engineering and construction efforts were made mandatory in view of the early need and critical importance of this plant to the progress of the overall power project.

On May 25, four days after Channel Constructors requested Meissner Engineers to prepare a flowsheet, general plant and building plans, and material balance, these were delivered, and approval was obtained from the Power Authority by Channel Constructors on May 27.

By July 3, Channel Constructors had completed the purchase of all major equipment, including screens, mills, crushers, conveyors, conveyor machinery, etc. In the meantime, on June 9 Meissner Engineers delivered the first concrete drawings to the field. Shortly thereafter, the construction crew began breaking ground on the 81-acre tract.

The steel contract was awarded, and structural steel details for the primary and secondary crushing



phases were forwarded to the fabricator on June 27. By August 1, outside and inside piping and electrical specs and drawings were completed, and the contracts were signed. On August 22, all concrete drawings were completed and delivered to Channel Constructors, and on September 24—just four months from start to finish—the engineering and detailing were completed.

The high degree of co-operation between Channel Constructors and Meissner Engineers in determining the equipment to use was a basic factor in meeting the tight schedule. A corollary benefit was realized in reduced engineering costs since revisions were held to the minimum.

Major Equipment A summary of the major items of equipment in the flow of a plant of this size will naturally reflect many impressive details. For example, nearly two miles of conveyors were installed throughout the operation, all supplied by Hewitt-Robins; these are fitted with approximately four miles of Goodyear belting.

Six crushers are included in the flow—a pair of Cedarapids 5360 double impeller impact breakers for primary reduction, two 5½-ft. Nordberg-Symons standard cone crushers on secondary, and two 7-ft. short head crushers of the same type on tertiary. Each primary crusher is supplied from its respective truck dump hopper *via* 60-in. by 25-ft. Rogers Iron Works apron feeder. A total of 27 Hewitt-Robins Vibrex screens were installed to handle the production and finish sizing.

In the sand plant, grinding is handled by a pair of 9½- by 13-ft. Allis-Chalmers center peripheral discharge rod mills. Sand classifying is done in four 28-ft. scalping tanks and four 44-in. by 32-ft. twin-screw classifiers—all Eagle Iron Works equipment. More than 7,500 hp. is represented in the total connected equipment load, supplied largely by Wagner Electric motors. U. S. Varidrive motors are used on several belt feeder installations. Of the 127 motors in the plant, 87 are rated at more than 20 hp. All necessary speed reduction is done through gear reducers supplied by Jones Machinery (Division of Hewitt-Robins). Westinghouse switch gear and G-E transformers are used throughout.

About 3,600 lineal feet (nearly 95 percent) of the total reclaiming tunnel length is formed of Commercial Shearing and Stamping Co. tunnel liner plate. Six Fairbanks-Morse, and four Allis-Chalmers pumps ranging from 10 x 8 in. to 14 x 12 in. are used for mill supply water, booster units, and tailings pumps.

Material Specifications The concentrated engineering and construction efforts and the equipment complex described above were focused on one goal—production of aggregates that would meet the rigid specifications of the Power Authority. Quantities (estimated by the Power Authority)

Another view of the intensive quarrying activity. The rock is removed in ledges averaging 20 to 25 feet.

of material that must be produced under those specifications include the following:

(a) concrete aggregates (crushed rock in four gradings, and sand in one)

6 x 3	565,000 tons
3 x 1½	1,425,000
1½ x ¾	1,660,000
¾ x 3/16	1,720,000
sand	2,130,000
	7,500,000

(b) embankment filter and crushed rock blanket material (crushed rock in four gradings, and sand in one)

3 x 6	300,000 tons
1½ x 3	520,000
1½ x ¾	510,000
¾ x 3/16	630,000
sand	940,000
	2,900,000

In the governing specs, which the products meet by a comfortable margin, the term sand designates concrete aggregate or filter material in which the maximum particle size is 3/16 in., and not more than 3 percent by weight is to pass a 200-mesh screen. In addition, as loaded into trucks, the sand can contain no more than 3 percent by weight of shale, clay lumps, coal, or other deleterious substances.

Other points specified were as follows: sp. gr.—not less than 2.60; Sodium Sulphate test—a weighted average loss of not more than 5 percent after five cycles; fineness modulus—2.50 to 3.00 (determined by dividing the cumulative percentage retained on the U. S. Standard sieves No. 4, 8, 16, 30, 50, and 100 by 100).

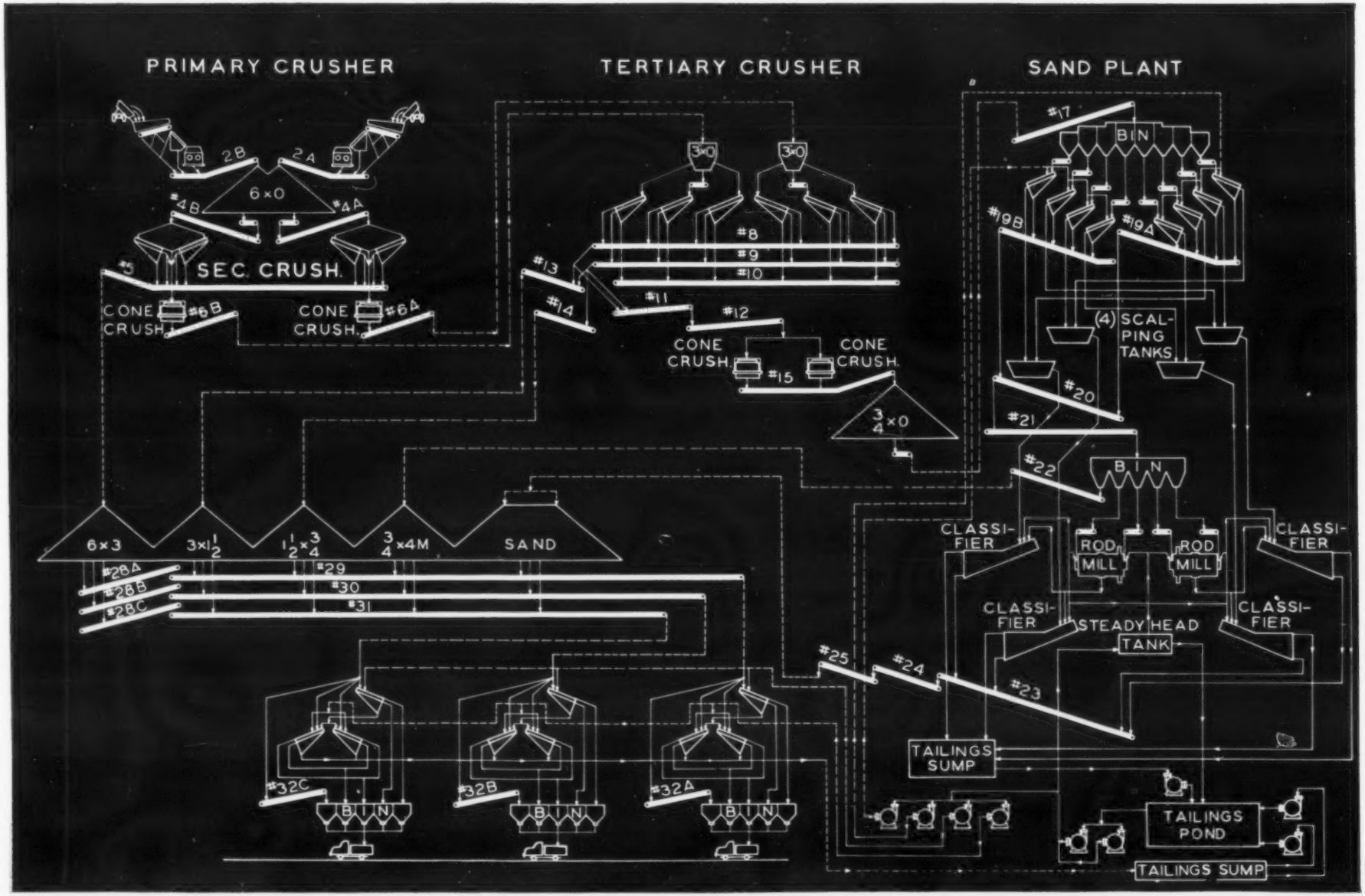
With respect to crushed rock, this term designates concrete aggregate, filter, or blanket material from 3/16 to 6 in. in size. It must be approximately equidimensional, angular, dense, and durable. In any size, as placed in stockpiles, the sum of percentages of all deleterious materials present shall not exceed 3 percent by weight. If the coarse aggregates show a weighted average loss of more than 8 percent after 5 cycles of the Sodium Sulphate test, they are rejected.

In the Los Angeles abrasion test, a loss of more than 40 percent by

Percent by Weight Passing Individual Sieves

U. S. Standard sieve size square mesh	3/16 to ¾ in.	¾ to 1½ in.	1½ to 3 in.	3 to 6 in.
7 in.				100
6				90-100
4			100	20-45
3			90-100	
2		100	20-55	
1½		90-100	0-15	
1	100	20-55		
¾	90-100	0-15	0-5	
⅜	20-55	0-5		
No. 4				
3/16	0-5			

A closeup of one of the two primary crushing installations. Plus 3-in. quarry-run material is separated from the feed on stationary grizzlies between the feeders and the crushers, and is delivered to the latter for primary reduction.


PRIMARY CRUSHER
TERTIARY CRUSHER
SAND PLANT
2B
2A
6×0
#4B
#4A
#5
SEC. CRUSH.
CONE CRUSH
#6B
CONE CRUSH
#6A
3×0
3×0
#8
#9
#10
#13
#14
#11
#12
CONE CRUSH
#15
CONE CRUSH
3/4×0
#17
BIN
#19B
#19A
(4) SCALPING TANKS
#20
#21
#22
BIN
6×3
3×1 1/2
1 1/2×3/4
3/4×4M
SAND
#28A
#28B
#28C
#29
#30
#31
CLASSIFIER
ROD MILL
ROD MILL
CLASSIFIER
CLASSIFIER
STEADY HEAD TANK
CLASSIFIER
#25
#24
#23
#32C
#32B
#32A
BIN
BIN
BIN
TAILINGS SUMP
TAILINGS POND
TAILINGS SUMP

weight after 500 revolutions also disqualifies the aggregate. More than 40 percent of flat and/or elongated particles are not permissible in any one size group, or more than 30 percent in all.

Grading of the crushed stone within the separate size ranges must conform to that shown in the table on page 78.

Production Flow

As seen in accompanying photographs, activity in the quarry is comparable in intensity to that of the entire project. The excavation is being done in an area where the covered concrete intake conduits will discharge into the forebay of the pump generating station and connecting canal to the main generating plant. (See map.) Construction excavation for these phases provides raw material for aggregates and the dikes.

Another specification made by the Power Authority was that care should be taken in quarrying to avoid inclusion of shale from the DeCew formation and lenses of chert or flint. Virtually all rock removed is from the Lockport dolomite in the Niagaran series of the Silurian system.

Ledges averaging 20 to 25 ft. in depth are established by drilling with a battery of Gardner-Denver DH-143 percussion crawler units fitted with 3¾-in. Timken carbide insert bits. Hole spacing is varied in accordance with formation conditions encountered. Explosive consumption has averaged about 1 lb. per cu. yd. of material shot down.

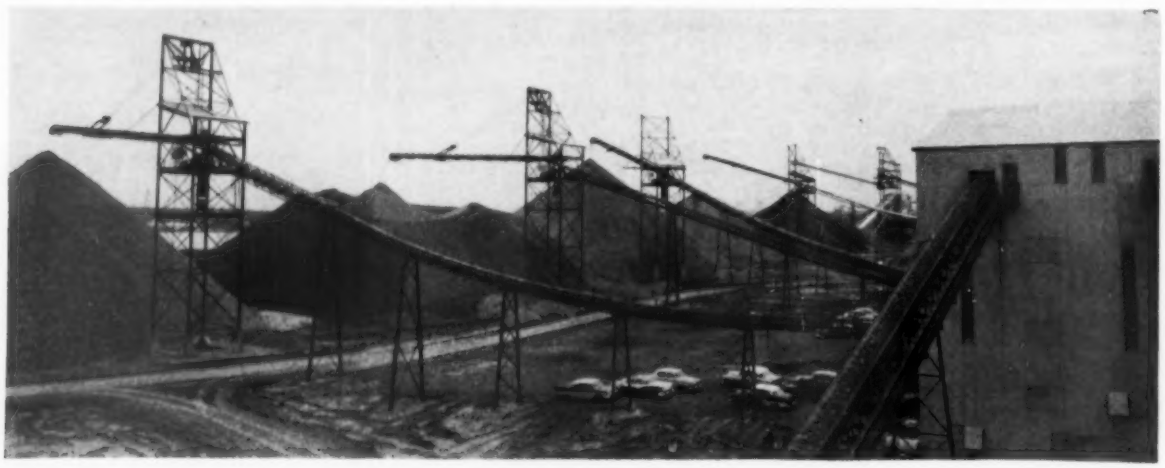
From the primary crushers, the dual 1,100-t.p.h. lines supply these twin surge piles ahead of the secondary crushing step.

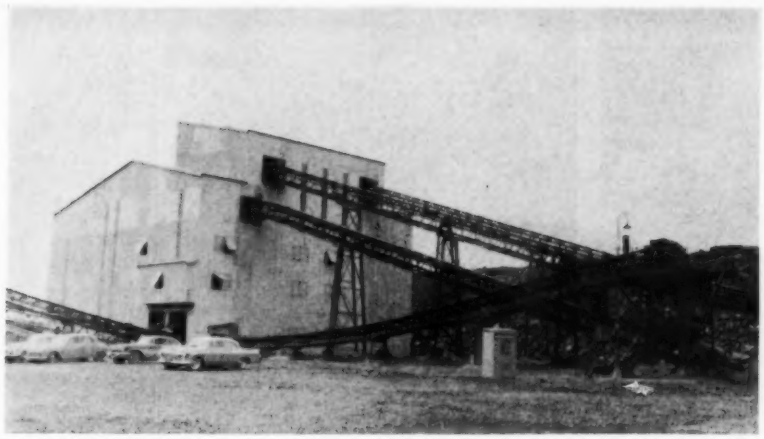
Broken stone is loaded out by 7-cu. yd. Bucyrus-Erie 150B electric shovels, and is hauled to the plant dump ramp by Euclid trucks fitted with 22-cu. yd. Easton side-dump bodies. At the ramp two loads may be discharged simultaneously into the respective hoppers of the primary crushers—the beginning point of the dual production lines. The side-dump bodies on the haulage units are actuated on the trucks, and no tipping hook is needed to dump the quarry-run material.

Primary Crushing The latter is transferred from the hoppers on 60-in. apron feeders to stationary grizzlies preceding the primary crushers. Plus 3-in. material enters the impactors, each of which is driven by a pair of 200-hp. motors, while the minus 3-in. material passing the grizzlies joins the primary crusher product on conveyors 2A and 2B. To protect the secondary crushers, R.C.A. metal detectors have been provided near the feed points of these two belts.

Below the surge piles, which have a combined capacity of about 40,000 tons, are separate reclaiming tunnels housing 10-ft. belt feeders. These are rated at 50-100 f.p.m. and 1,200 t.p.h. capacity and they deliver to belts 4A and 4B, which supply the secondary crushing lines. Capacities of all conveying lines are shown in an accompanying table. Control and sequence interlocking of the A and B lines in this section are identical; they are independent of each other and also of the secondary crushing phase.

A view from the primary end of the operation showing finished materials stockpiles, left, and secondary crushing building, right.





This tertiary crushing installation and the secondary phase are handled as a composite unit with respect to sequence interlocking and starting control, and must be operated simultaneously. (See detail in text.)

Secondary Crushing At the top of the secondary crusher building each conveyor discharges through bifurcated chutes to a pair of 6- by 16-ft. double-deck screens, where separation is made on 6-in. and 3-in. top and bottom decks, respectively, on all four screens. Plus 6-in. material from each pair of screens discharges directly to the respective one of the two 5½-ft. standard cone crushers; the bottom deck throughs are chuted to conveyors 6A and 6B and are joined by the secondary crusher products for transport to the tertiary crusher building.

Material retained on the bottom deck may be chuted either to the crushers or to conveyor No. 5 for delivery to the stockpile of 6 X 3 stone. This conveyor has been fitted with a lofting boom suspended from the support tower so that the drop height onto the pile may be reduced and degradation of the stone minimized.

Tertiary Feed entering the tertiary phase is discharged into small feed-surge bins ahead of two lines of three 6- by 16-ft. double-deck screens. All of these are fitted with 1½-in. opening top deck screencloth and ¾-in. cloth on the lower decks. The fraction retained on the top decks is chuted to conveyor 8, that from the lower decks to conveyor 9, and the throughs to conveyor 10. The larger and the medium-sized fractions on the first two belts may discharge *via* flop gates to conveyors 13 and 14, respectively, for transport to stockpile or to belts 11 and 12, from which the two 7-ft. short head tertiary cone crushers are fed. (At the discharge point of belt 12, a flop gate permits feeding either crusher from either production line.)

Lower deck throughs are transferred from conveyor 10 to conveyor 15, which also receives the tertiary crusher products, and this material is transferred to the ¾ x O surge pile ahead of the sand plant. Conveyor 13, noted above, is also provided with a lofting boom from which the drop of the 3 x 1½ material onto the stockpile is controlled.

Although continuing a separate flow through the secondary and tertiary phases, the A and B lines are not completely independent with respect to conveyors 5, 10, 11, 12, and 15, since the latter are common to both. However, as long as these common conveyors are operating, either A or B line may operate if the other is shut down.

Since conveyors 6A and 6B (which receive the secondary crusher product) are interlocked with the belt feeders supplying the screens in the tertiary phase, the secondary and tertiary crushing sections must be operated simultaneously. They are therefore handled as a composite unit with respect to sequence interlocking and starting control. The entire sequence in the tertiary section must be completed from its control panel before that in the secondary can be actuated.

Conveyor Data

Conveyor	Width (in.)	Length (c.c.)		Capacity t.p.h.	Hp.	Application
1A, 1B	60	28 ft.	0	1,200	50 ea.	pan feeders
2A, 2B	42	286	0	1,200	150 ea.	to primary surge
3A, 3B	42	10	0	1,200	15 ea.	primary surge reclaim
4A	42	273	0	1,100	150	to secondary building
4B	42	310	0	1,100	150	to secondary building
5	30	388	0	350	50	to 6x3 stockpile
6A, 6B	42	256	0	1,100	100 ea.	to tertiary building
7A, 7B	42	8	6	400	7½ ea.	belt feeders to screens
8	36	71	0	700	10	screen products
9	36	71	0	600	10	screen products
10	36	58	6	700	10	screen products
11	36	137	0	650	20	to tertiary crushers
12	36	185	0	650	40	to tertiary crushers
13	30	328	0	700	100	to 3x1½ stockpile
14	30	382	0	600	75	to 1½x¾ stockpile
15	42	360	0	1,400	150	to sand plant surge
16	42	11	0	1,200	15	sand plant surge reclaim
17	42	360	0	1,200	150	to sand plant
18A, B, C, D AA, BB, CC, DD	36	9	6	150	3 ea.	belt feeders to sand plant screens
19A, 19B	30	62	5	450	5 ea.	rod mill belt feeders
20	36	107	6	900	40	to rod mill feed bins
21	36	189	0	900	40	to rod mill feed bins
22	36	421	0	800	100	to ¾x4M stockpile
23	36	166	0	800	40	to sand stockpile
24	36	269	0	800	100	to sand stockpile
25	36	117	9½	800	40	to sand stockpile
26A, 26B	24	6	6	75	3 ea.	rod mill belt feeders
27A, 27B	24	22	7	75	3 ea.	rod mill belt feeders
28A, 28B, 28C	36	188	8½	600	25 ea.	stockpile reclaim feeders
29	36	1,470	0	800	150	stockpiles to shipping bins
30	36	1,371	0	800	150	stockpiles to shipping bins
31	36	1,274	0	800	150	stockpiles to shipping bins
32A, 32B, 32C	36	25	0	800	10 ea.	sand conveyors (bypass)

The two tertiary crushers. At this point provision is made for either production line to feed either of these crushers.

Each of the four scalping tanks in the sand plant receives throughs from a pair of preceding screens.

Sand Plant A belt feeder housed in the tunnel below the ¾ x O surge pile supplies conveyor 17, which in turn discharges to a feed and surge bin at the top of the sand plant. Two lines of four 6- by 16-ft. single-deck screens are fed from this bin *via* individual belt feeders. All screens are fitted with 4-mesh screencloth and with spray bars. The two lines face each other, and each screen in each line is paired with its opposing screen with respect to the underlying scalping tanks.

Retained material, ¾ x 4M, is discharged to conveyors 19A and 19B from the respective screen lines, and is transferred *via* conveyors 20 and 21 to the feed and surge bins for the rod mills. Any amount in excess of that needed for the desired rod mill production rate is discharged from conveyor 21 to belt 22 and is carried to stockpile.

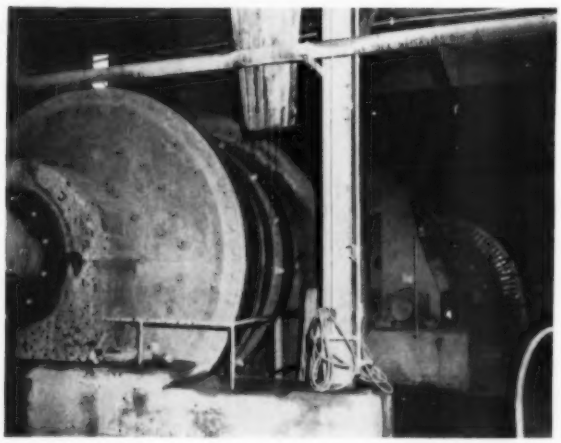
Hoppers below the paired screens receive the minus 4-mesh throughs, which are flumed to the respective one of the four 28-ft. scalping tanks. From the various ports of the scalping tanks, sand may be delivered in any proportion either to the tailings sump or to the following four classifiers. Overflow from the launders of the twin-screw dewaterer-classifiers is flumed to the sump, from which it is pumped to the tailings pond by 12 x 10 Allis-Chalmers pumps, and the sands are discharged to conveyor 23. They are then transported to stockpile on conveyors 24 and 25. The latter is a swinging boom section suspended from the support tower, and the sand stockpile thus created is kidney-shaped.

Four variable-speed feeders are used to draw from the rod mill feed bin to supply the mills. With this system, a balanced feed can be established to both ends of each mill, and any desired production rate up to the design capacity of 600 t.p.h. may be maintained.

The mills are driven by 700-hp. synchronous motors, and are charged with 62½ tons of 3-, 2½-, and 2-in. rods. Each may be operated independently but only when the flow line of screens, tanks, and classifiers of which it is a part are also in operation. Splitter gates in the mill discharge launders divide the product between the two classifiers in the respective flow line. As detailed previously, the classifier

One of the four classifiers processing material from the scalping tanks.

A balanced feed to both ends of each of the rod mills is provided by variable-speed feeders.



discharge is received on conveyor 23.

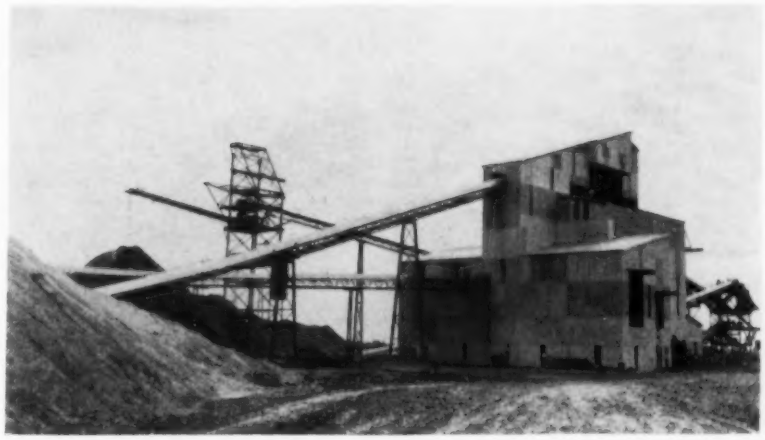
Two separate water systems have been provided for the sand plant. A high-pressure system delivers water at 40 p.s.i. to the screen sprays and the tailings pump gland seals, and a low-pressure flow is supplied to the classifier launders and submerged bearings and the rod mills.

A central control panel in the sand plant is so arranged that either A or B lines in the sand plant may be operated independently. Each line has sequence interlocking and requires starting the pumping system first. The feed to the sand plant may also be controlled from this point, although normally a high- and low-level Bin-Dicator system actuates the drive motors for the surge pile feeder and conveyor 17 when the feed bin is low, and *vice-versa*.

Stockpile Reclaiming Each of the conveyors in the three separate reclaiming tunnels is fed from the overlying stockpiles *via* air-cylinder-actuated drop gates and feeder conveyors 28 A, B, and C. Two drop gates are installed under each pile in each tunnel, with the exception of the sand pile, which has four gates per tunnel.

All gates and the following conveyors in each tunnel are controlled from a panel located in the re-screening station above the shipping bins for that particular system. The three systems are identical and are completely independent of each other.

Conveyors 29, 30, and 31 transport materials from the tunnels to their respective rescreening stations. In each of the latter the stone is discharged to a 6- by 14-ft. double-deck screen. Both decks are equipped with spray bars, and are fitted with 3-in. and 1½-in. opening screencloth on the upper and lower decks, respectively. The two retained fractions are discharged into the appropriate shipping bins below *via* chutes and stone ladders, and the lower deck throughs are split to a following pair of 6- by 14-ft. double-deck screens.

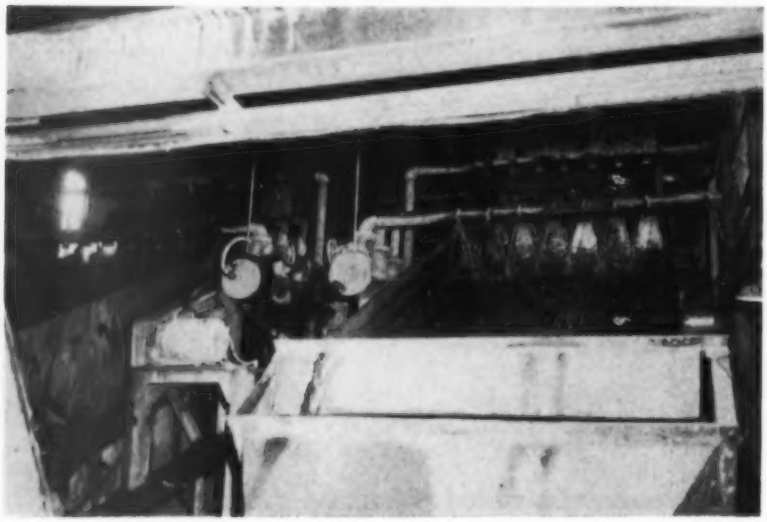


Eighteen units of basic processing equipment are installed in the sand plant. Feed from a surge pile is brought in on the inclined conveyor (foreground) and finished sand is discharged to a stockpile from the boom conveyor (background).

Independent operation of both production lines in the sand plant is controlled from this panel. Sequence interlocking in each line requires starting the respective pumping system first.

A view down one of the stockpile reclaiming tunnels from a point below the sand storage. About 3,600 lineal feet of combined tunnel length is lined as shown.

The three rescreening and shipping stations are identical and completely independent of each other. Each is capable of loading out any one of the grades of material at the rate of at least 20 tons per minute.



Two of the three screens in one of the shipping stations. Sand is the only material reclaimed from stockpiles that by-passes these screens en route to the underlying shipping bins.

The latter screens have ¾-in. upper and 5-mesh lower deck openings, and are also equipped with spray bars. Retained products are again chuted to their respective bins, but the lower deck throughs are flumed to tailings sumps.

Sand recovered from stockpile, the only material that does not require rescreening and washing, bypasses the screens and is discharged from the reclaiming belts to conveyors 32 A, B, or C, as the case may be, and then carried to the sand bin of each shipping station.

The system above provides, for any one of the three stations, that when 6 x 3 and 3 x 1½ stone is being processed, all three screens—and sprays—must be in operation; however, when 1½ x ¾ or ¾ x 4M material is loaded, the upper screen can be shut down, and the flow can be directed to the two lower screens.

Each of the five 20-ft. square shipping bins in each shipping station is equipped with air-actuated clam-shell gates that are controlled from an operator's booth. This booth is so positioned, on each set of shipping bins, that the operator can see all loading points. Trucks, when loaded, are driven to a nearby weight station and weighed out over 100-ton Buffalo scales.

Pumping Water requirements of the operation are met by filling the tailings pond from a water main near the plant site. Two 7,500 g.p.m. 14 x 12 Fairbanks-

Below: An overall view of the plant site from one of the shipping stations. At the left is the steady head tank from which a uniform low-pressure flow is provided for the sand plant classifiers and rod mills. The sand stockpiling conveyor (right) has a swinging boom section suspended from the support tower.

Morse pumps at the pond deliver the water through a 30-in. line to a set of four 2,600-g.p.m. 10 x 8 F-M pressure pumps. An 18-in. riser from the large line supplies a 20,000-gal. steady head tank. Excess water is returned through an overflow to the clear water section of the pond. Most lines in the water system are comprised of sections of Naylor Spiralweld pipe joined by Wedgelock couplings.

Screen sprays in the shipping stations, and those in the sand plant noted previously are supplied from the high-pressure pumps, while the steady head tank provides a uniform low-pressure flow for the sand plant classifiers and rod mills.

General Under the supervision of Lee Rowe, project manager, Ray Condos, plant superintendent, and Ernie Potarf, assistant plant superintendent, the plant is in production six days a week.

With the exception of embankment and filter material used by Channel Constructors in their contract section, and haul road repairs, the entire output is hauled and used by the other project contractors, primarily for concrete construction of the various installations.

At completion of the power project, scheduled for 1962—or such time as aggregate demands have been fully met—the area now occupied by the plant will be landscaped and will become a part of a large park adjoining the reservoir, pump generating station, and the main station forebay.

However, long after the current frenzy of activity has subsided and the operation has been dismantled, the impressive structures of the Niagara power plants, and the attendant development, will give conspicuous testimony to the men—and the material—that made them possible.

National Crushed Stone Assn. Joins Joint Committee

The Concrete and Aggregates Producers side of the CAP-Associated General Contractors Joint Cooperative Committee now includes three members, the newest being the National Crushed Stone Association. The other two are the National Sand and Gravel Association and the National Ready-Mixed Concrete Association.

CAP-AGC held its first exploratory meeting in Miami Beach last January and reported: "It is easily determined that the interdependence of our industries presents many areas of mutual interest on which joint co-operative efforts can be highly beneficial to all. . . . It definitely appears that the deliberations of the new committee can formulate co-ordinated polices which may result in more effective work."

The next meeting is scheduled for later this year, and all four organizations are expected to have representatives present.

Problems of interest to CAP-AGC include the following:

1. Expansion of highway construction brought about by the long-range federal-aid program.
2. The steady increase in the dollar volume of construction.
3. Quality standards for concrete and aggregates.
4. Problems resulting from Davis-Bacon and other labor laws.
5. Local codes restricting concrete and aggregates producer operations and the desirability of proper regulatory controls.
6. Public relations to develop an understanding of the importance and need for concrete and aggregate materials in the nation's economy and the construction industry.

R. W. McKinney, AGC, Nacogdoches, Tex., is chairman of the committee, and James M. Sprouse, manager of the AGC Highway Division, is secretary.

National Crushed Stone Association members include Charles Coburn, Waukesha, Wis.; K. K. Kinsey, Cedar Rapids, Iowa; G. D. Lott Jr., Columbia, S. C., and W. C. Rowe, Malden, Mass.

Other CAP members from the National Sand and Gravel Association and the National Ready-Mixed Concrete Association include Ralph H. Anderson, Columbus, Ohio; Fred P. Curtis, Omaha; E. K. Davison, Pittsburgh; Herbert G. Jahncke, New Orleans; Robert Mitchell, Los Angeles; John W. Murphy, Spokane, Wash.; John W. Roberts, Richmond, Va.; and F. E. Schouweiler, Fort Wayne, Ind.

In addition to the chairman, the AGC members include B. B. Armstrong, Roswell, N. M.; W. A. Bechthold, Milwaukee; R. A. Bradshaw, Salisbury, N. C.; M. A. Erland, Portland, Oreg.; M. B. Findorff, Madison, Wis.; Max C. Harrison, Pittsburgh; E. W. Menefee, Sedalia, Mo.; Dan J. Mooney, Butte, Mont.; Ralph E. Rice, Boise, Idaho; Fred I. Rowe, Columbus, Ohio; and F. Roland Sargent, Saginaw, Mich.

Ideal Cement's Tijeras Plant On Full-Scale Production

Full production is scheduled to begin at the new $12,000,000 Tijeras, N. M., plant of the Ideal Cement Company. Capacity will be in excess of 1,000,000 bbl. of portland cement per year, on the basis of a 24-hr., 365-day schedule.

A central pushbutton system permits one man to control the operation of the entire plant from crusher to storage. Television monitoring is utilized in the kiln process.

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The Petaca plant, built in 1955, is in a remote section of northern New Mexico, 62 miles north of Santa Fe.

Mica Processor Employs Fluid Energy

By HARRY F. UTLEY

SINCE it began production in 1955 in the foothill country of northern New Mexico, the Petaca Mining Company of Santa Fe has advanced so rapidly that its mining and milling of ground mica is one of the largest operations of this kind in the United States.

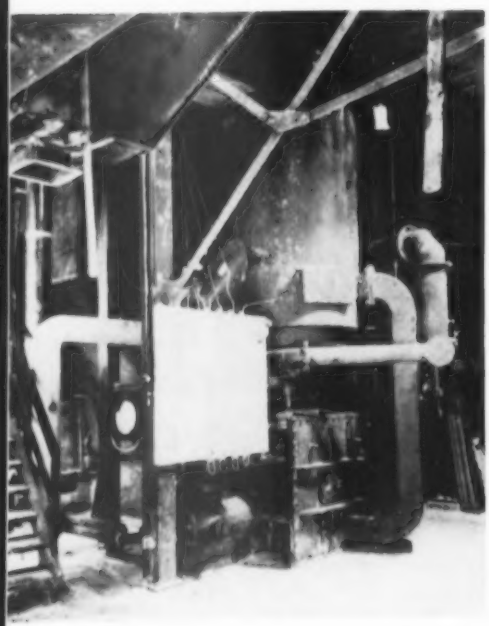
Located 62 miles north of Santa Fe, the plant is currently turning out close to 100 tons of finely-ground mica per 24-hr. day. Eight products ranging in size from No. 20 mesh (the coarsest) to the finest, which is in the range of 40 percent through 325-mesh, are now being manufactured. All fine grinding is done by fluid-energy milling.

In November, 1956, about a year after the quarry had been opened up and the new processing plant had begun operating, the owners leased the entire operation to Minerals Engineering Company of Grand Junction, Colo. Since taking over, Minerals Engineering has improved the flowsheet and speeded up production remarkably.

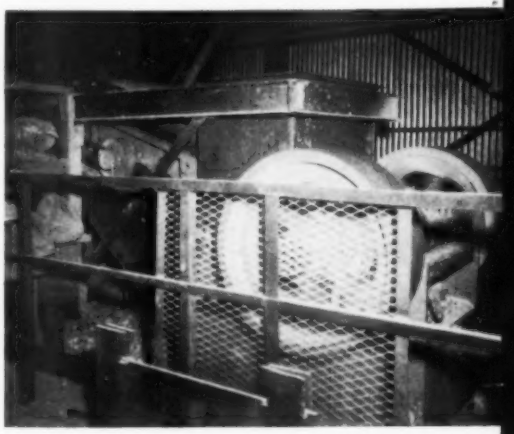
The quarry is about 2 miles from the plant, and the mica, which occurs in pegmatite ore-bodies, is drilled and blasted in benches. Shovels load dump trucks for delivery to the receiving hopper at the plant.

Primary crushing at the plant is done by a Cedarapids 18- by 24-in. jaw-crusher, which is set to reduce the ore to a top size of about 1½ in. The mica itself occurs in small "books" scattered through the formation, which runs largely to limestone and quartz.

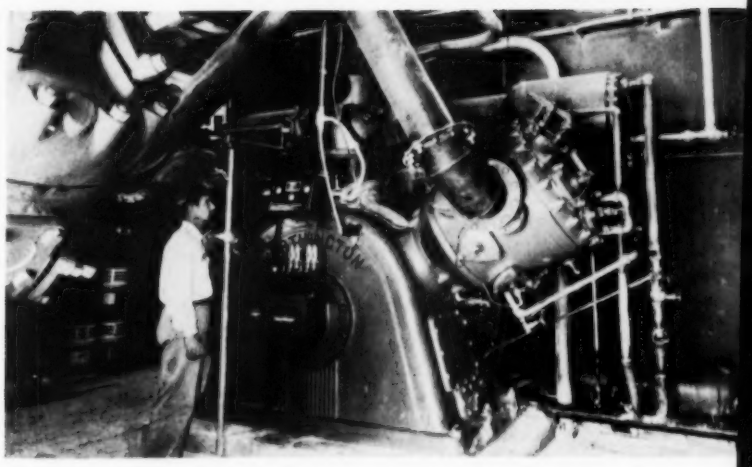
After initial reduction, the crushed ore is conveyed to a pair of Allis-Chalmers screens in closed circuit with a 3-roll crusher designed to yield a mill-feed product in the range of ½ in. to No. 18 mesh. It



Left: A view of the fluid-energy mill, which does the entire job of air grinding and classification of the mica. Flash drying is also incorporated in the mill.



Right: Ore is first reduced to minus 1½-in. size in this primary jaw crusher.



This vertical-angle 3-cylinder compressor and a 2-cylinder unit supply air to the fluid-energy mill for jet pulverization of the mica.

to Grind, Classify to 8 Fine Sizes

is important that the fines (minus 18-mesh), containing both mica and rock dust, be wasted as screen throughs since it is practically impossible to separate the fine mica from the rock dust by mechanical means. In the screening process, however, the coarse, flat mica flakes are retained while the undesired material passes the screen decks and is carried away to waste.

All grinding and classifying is done by fluid-energy milling in a Majac jet pulverizer employing superheated compressed air wherein the minus ½-in. mica is ground by impact against itself. The mica is carried to the mill from the feed bin by a screw conveyor.

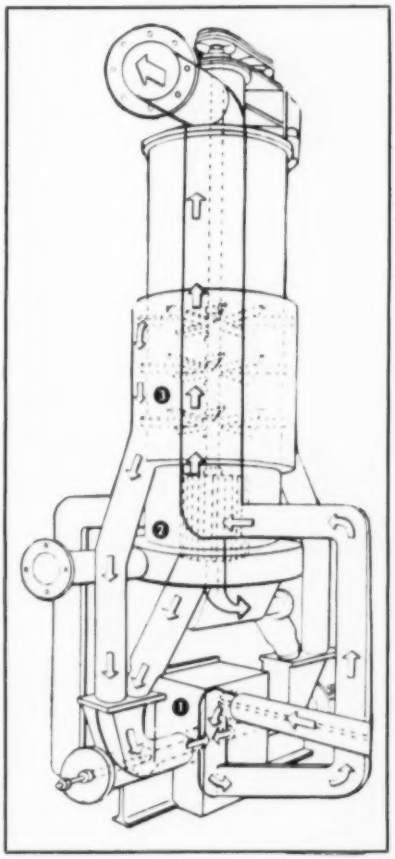
Impact grinding and flash drying take place while the material is entrained in two directly-opposed high-velocity jets of heated compressed air. The particles then move upward through a stripping zone, where drying is completed, and on into the mill-classifier section. Here, power-driven rotor blades throw oversize elements to the outer periphery of the classifier shell. They drop back to the air jets in the pulverizer section for further reduction in the jet-stream cycle. Particle size is closely controlled by regulating the rotational speed of the classifier blades so that only particles of the desired size are permitted to be discharged from the mill.

Energy for pulverization is provided by 2,500 c.f.m. of free air compressed to 100 p.s.i.g., then heated to 800 deg. F. in an oil fired furnace and delivered to the two opposed high-pressure nozzles in the Majac mill.

Compressed air is supplied by two Worthington vertical-angle compressors, one a 2-cylinder and the other a 3-cylinder unit equipped with an after-cooler. Both compressors are electric-motor driven by power produced in the Petaca plant by diesel-driven generators.

Finely-ground mica of the desired size passing the rotor blades in the mill classifier section is carried upward in air suspension to a bag-house for collection and finally to the various end-products bins. The finished product is trucked to Santa Fe, where a warehouse is maintained and where rail shipments are loaded. Some of the output, however, is trucked directly from the plant to industrial users in the Rocky Mountain area. Important users of the product are the roofing, paint, and rubber manufacturers.

Plant and quarry operations at Petaca are under the supervision of John B. Devany.



Cut-away view of the jet pulverizer. Coarse mica feed enters the pulverizing chamber (1), where it is impacted against itself while entrained in the two directly opposed high-velocity air-jet streams. Drying takes place in the intermediate zone (2), and classification is accomplished (3) when the power-driven blades throw oversize particles to the outer periphery of the shell for return to the jets for further reduction. Desired fines pass upward to the bag-house for collection.

Nelson H. Bogie, vice-president and general manager of the company.

Six sizes produced simultaneously from crusher run to agstone— output can vary from 20 to 50 percent agstone

Flexibility Highlights South

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT REPORT

WHEN, in August 1957, ground was broken for the new 250-t.p.h. crushed stone and agstone plant of Western Materials, Inc., near Parsons, in southwestern Tennessee, every possible step had been taken to insure its success. This general area was selected because there are no such plants west for 100 miles to the Mississippi River or southwest for an even greater distance. As a result, crushed stone or agstone formerly had to be shipped in, some of it by rail from a considerable distance. The deposit selected by Western Materials was only 7 miles from the proposed cross-state highway.

The deposit, in the Decatur formation, is a high-calcium limestone (96½ percent Ca CO_3) low in silica and magnesia. Its specific gravity is 2.68, its Los Angeles rattler test is 24.7, and its soundness is 96.97 percent. Five test holes were drilled with a Davey rotary drill, using a 3½-in. core bit, to a depth of 70 ft. without running out of good rock. These tests determined the selection of this location for the plant, and the low silica content of the rock was the reason for the selection of an impact type of primary crusher.

Ground was broken for the plant in August, 1957, and construction was begun early in 1958. Operations began on April 22, 1958. It was designed by Nelson H. Bogie, vice-president and general manager of the company, with the co-operation of the equipment manufacturers involved. Its designed capacity of 250 t.p.h. is achieved without difficulty. At this output about 30 percent is agstone, but this product can be varied between 20 and 50 percent as desired, with a consequent increase or decrease in total output. The primary crusher has a capacity of at least 400 t.p.h., and the balance of the plant can be brought up to this level by the addition of a few items of equipment.

Flexibility was the primary aim, and this aim has certainly been attained, through the use of chutes, conveyors, etc. A feature is the fine scalping screen over the return conveyor, which removes agstone, as do the main sizing screens preceding and following it. Also unusual is the use of two hammermills, one for the regular flow, and the other for agstone only. Additional specialties can be made by installing a cone crusher at the fine scalping screen station. All concrete footings are low, and equipment is mounted on steel for accessibility.

On the property there are three outcroppings of the deposit, each about a mile long and sloping uphill to the east about 35 ft. per mile. The center outcropping is being worked first, and the plant is located to be near all three. In the design provision was made for later location of the primary crusher in the quarry, with a conveyor running out to the present raw stockpile.

Overburden now averages 27 ft. in depth and it will reach 40 ft., later dropping to almost nothing as the quarrying progresses. Included is a 2-ft. bed of shale which must be drilled and blasted. All overburden removal is done with quarry equipment during the winter season. At the start there were several large fissures or "dirt cutters" in the deposit, but there are no seams; and the quarry is now in solid rock. The quarry will be worked for some time with the present 40-ft. face.

Drilling is done with a Gardner-

This general view of the new 250-t.p.h. crushed stone plant of Western Materials, Inc., at Parsons, Tenn., shows the primary crusher and surge stockpile (left background).

western Tennessee Plant

Denver 123 deep-hole drill using 10-ft. Series 700 Gardner-Denver steel and 3-in. Timken carbide-insert X-bits. This setup averages 320 ft. of hole per 8-hr. day, and the bit has been sharpened only once in three months. During this period the drill was used nearly every day, either in the quarry or in drilling shale or rock in the overburden.

During the development of the quarry no definite drilling or blasting plan was possible. Later 8- by 8-ft. spacing was used with the 40-ft. face. Due to some toe trouble the spacing was changed to 7- by 8-ft., and 30-hole double-row shots are now made. These are giving excellent results. A combination of Atlas 60 percent dynamite and Austin ammonium nitrate prills is used. Three sticks of dynamite are placed at the bottom of the hole with an electric exploder under them. Then 3 ft. of ammonium nitrate is used alternately with single sticks of dynamite, for a total of 5 or 6 sticks per hole. About 30 in. of tamping is used. No. 1, 2, and 3 delays are used on the back row, and the wiring is hooked up in series to a 150-hole battery. No secondary shooting is necessary.

A Northwest 80D shovel, with a 2½-cu. yd. dipper and a Northwest diesel engine, loads the stone into three Euclid 91FD trucks with General Motors 671 diesel engines. These all have quarry-type sandwich bottoms and haul 16-ton loads. The haul at present is about 600 ft. one way. The ramp to the primary crusher was blasted out of rock, and the fill has a retaining wall of huge boulders blasted out while the quarry was being opened.

The rock is dumped on a 16-ft. long, 9-in. pitch Universal heavy-duty feeder with a rock-turning type of hopper. The Universal 4650 double-impeller Impactmaster pri-

The 2½-cu. yd. diesel shovel loading stone into one of three 16-ton diesel quarry trucks.

The double-impeller primary crusher and heavy-duty feeder with the rock-turning hopper at the right.

mary crusher is driven by two 150-hp. motors. Minus 3-in. rock is discharged on a 42-in. by 30-ft. conveyor (No. 1) which has idlers spaced 8 in. apart. A 30-in. by 120-ft. inclined belt conveyor (No. 2) operated at 380 f.p.m. discharges the rock on a 5,000-ton raw surge stockpile. These, and all other belt conveyors, have Universal greaseless idlers, and Goodyear extra-heavy conveyor belts.

This pile has a live storage capacity of 1,500 tons without rehandling through a single opening in the reclaiming tunnel. The tunnel consists of 70 ft. of 7-ft. diameter Armco 10-gauge corrugated culvert pipe. A No. 45 Syntron electric vibrating feeder controls the discharge onto the 30-in. by 210-ft. main belt conveyor (No. 3).

At the top of the screening tower the rock is discharged on a 5- by 14-ft. Screen Equipment Co. Seco 3-deck vibrating screen (No. 1). This ordinarily has 1¼-in. and ½-in. wirecloth on its top and middle decks, and on the bottom deck it has four sections of stainless steel cloth—three 1/16-i.. and one ¼ in. The material over the middle deck, ⅜- to ½-in. State Size No. 15, is chuted into one of six 75-ton bins. Material over the bottom deck, ½- to ¼-in. No. 19, is chuted to another bin. Material passing through the three 1/16-in. sections of the bottom deck is agstone, which goes to a third bin.

The 1- to 3-in. oversize over the top deck of this screen and the ¼- to 1/16-in. material through the fourth section of the bottom deck drop into a 4 XC Gruendler center feed hammermill. This unit is equipped with rock bars spaced 4 in. apart, and is driven by a 200-hp. Westinghouse motor.

A 30-in. by 70-ft. belt conveyor (No. 4) carries this material to a 4- by 16-ft. Seco 2-deck screen (No. 3), which ordinarily has ¾- and 1/16-in. openings. The throughs are agstone, which goes *via* an 18-in. by 30-ft. conveyor (No. 6) to a separate 50-ton truck-loading bin.

The other two sizes off this screen are carried on a 30-in. by 90-ft. belt conveyor (No. 5) to a second 5- by 14-ft. Seco 3-deck screen (No. 2) alongside the first. This screen ordinarily has ¾- and ⅜-in. openings on its top two decks. On bottom deck there are three sections of 1/16-in. and one of 3/16-in. cloth. Material over the middle deck, ¾- to ⅜-in. State Size No. 16, is chuted into a bin. That over the bottom deck, ⅜- to 3/16-in. No. 23, is chuted into another bin. Minus 1/16-in. material through these sections of the bottom deck goes to the agstone bin first mentioned.

The ¾- to ¼-in. oversize over the top deck of screen No. 3 and the 3/16- to 1/16-in. material through the fourth section of the bottom deck drop into a 3042 Williams hammermill. This mill has ¼-in. spaced lime bars and is driven by a 200-hp. Newman (England) motor. The minus ¼-in. product of this crusher is discharged on conveyor No. 4 to screen No. 3.

The above is the flowsheet at the time this plant was visited, but the arrangement of chutes and changes of screen cloth make possible a wide variety of size combinations. It is also possible to concentrate production on certain sizes in current demand, including agstone. Normally, about 30 percent of the 250-t.p.h. output is agstone, but this ratio can be varied from 20 to 50 percent, as desired.

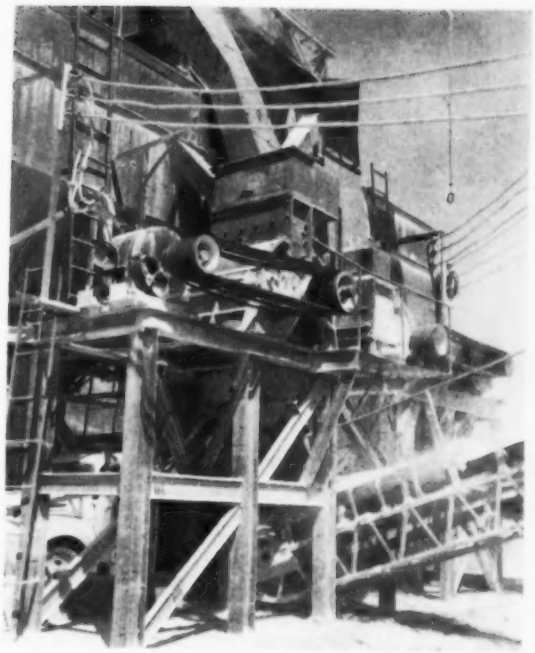
The main screening station, which has two sets of screens and hammermills.

Several of the possible options are here described. The No. 1 screen can be by-passed and all of the minus 3-in. rock discharged into a bin as crusher run. Or this material can go first to the Gruendler hammermill and then to a bin as minus 1¼-in. dense aggregate (No. 33C). The 1¼- to ¾-in. oversize from the No. 2 screen can be chuted to the Gruendler hammermill if more agstone is desired; if less agstone is desired, this oversize can go back to screen No. 1 *via* conveyors No. 4 and 5. At the No. 3 screen, where agstone is normally made, a blacktop size can be taken out for separation on the No. 2 screen.

All sizes produced are stockpiled. Trucks are loaded from bins through clamshell gates and from piles by a 2¾-cu. yd. Michigan 175A front-end loader and a Hough 1½-cu. yd. Payloader. Shipments are weighed on a Winslow scale with a 40-ft. platform.

There was no problem involved in selling the crushed stone since the product is good and the competition has the handicap of high rail freight rates. Agstone has a similar price advantage over competition; but, due to the high freight rates, no sizable market had ever been developed. Farmers formerly had to split cars, which was another deterrent to the sale of agstone. The company therefore did everything possible to encourage greater use of agstone. A pasture program was started, and the demand in some counties has doubled as a result. Agstone is delivered in the farmers' trucks or in hired trucks. Agstone fineness is 97 percent through 10-mesh and 51.5 percent through 40-mesh, compared to requirements of 85 and 50 percent respectively. The calcium carbonate content averages 93 percent; requirement is a minimum of 85 percent.

Western Materials, Inc., is a partnership owned by its officers, who are Herman Genet, president, and Nelson H. Bogie, vice-president and general manager. The late Fred Hufstettler was secretary. Mr. Genet is also president of Greenville Quarries of Greenville, Ky., and of the Genet Stone Company, Cynthiana, Ky. He also heads the Genet and Hufstettler Coal Company at Greenville, which is a strip coal mining operation. Mr. Bogie has had many years of experience in the design and operation of nonmetallic minerals plants. He has also sold equipment in this and other fields and at one time had his own equipment distributing business.



A closeup shows the arrangement of chutes from two screens to two hammermills, one for general reduction, and the other for agstone.

Another view of plant, with the agstone screen and bin at the right (foreground).

Vermiculite

(*From page 68*)

ing steel construction for such ratings.

"The benefits to be gained from sound absorption and improved appearance from the application of prestressed concrete also increase the sales opportunities for this type of construction."

D. J. Boone, chairman of the agricultural committee, reported that sales of standard horticultural vermiculite and fertilizer conditioner had increased substantially. Use of vermiculite as a carrier for weed and pest control is increasing also, due to favorable experience, he said.

C. R. Babb, chairman of the concrete committee, reviewed the last year's gain in vermiculite concrete roof deck installations.

The Coming Role of Pozzolans

development of modern and new manufacturing

By WOLF G. BAUER
Consulting Engineer

Part I
Basis for an Industry

DURING the last decade or so we have witnessed a growing interest in pozzolanic materials and their increased acceptance as welcome and often necessary ingredients in modern concretes and concrete products. There are a number of pertinent reasons why pozzolans are beginning to be looked upon not only as special-purpose ingredients of special-purpose concretes, but also as multi-purpose ingredients for multi-purpose or universal types of concretes. There are also many reasons why we are apparently on the threshold of another "new" industry situation similar, in some respects, to that of the lightweight aggregate industry contemplating its future in 1946.

However, there are certain major differences between the problems faced by that industry, and those now confronting a pozzolan industry as such. These differences are interesting and rather important, and their recognition is basic to the proper technical and economic development in producing and marketing this cement-improving and concrete-stabilizing material.

Without repeating in detail what has been frequently discussed in the literature about the advantages of suitable pozzolanic materials in concrete, it should be emphasized here that pozzolans in the past have been employed primarily to overcome specific shortcomings of special concretes, irrespective of whether such shortcomings were due to the nature of the cement or the aggregate used. True, the chemical instability of our modern rapid-strength high-lime portland cements has been recognized, and it has been partially met by the establishment of several classes of cement.

However, it is one thing to set up adequate specifications for more stable and resistant types of cements of higher dicalcium and lower tricalcium silicates and aluminates, or of low alkali content, but quite another matter to make such cements readily available at low cost in every region and at all times. Our preoccupation with rapid strength for the sake of convenience and costs, has not served to stimulate the cement manufacturer into a program of re-educating us to the values and use of more permanent and resistant type slower setting cements. This is understandable in view of the higher cost of manufacture and the problems it poses in certain localities on the basis of raw material constitution.

Inherent Instability of General-Use Cements

It is certainly not the intent of the writer to brand modern cements as dangerous and unstable compounds which are not to be trusted. On the contrary, good progress has been made in efforts to offer the user a material upon which he can depend, and with which he can design a concrete of good quality—provided that the concrete maker's use of water, type and grading of aggregate, and techniques in handling, mixing and placing are correct; and further, that no undue and unforeseen soil, weather, and water conditions of natural or man-made origin chemically attack certain mineral constituents.

However, despite finer grinding and higher burning temperatures for lower free lime in present-day cements, higher tricalcium silicate and aluminate content for earlier strength development has also increased the release of chemically reactive hydrated lime into the pore space and liquid phase of the resulting concretes. This unavoidable hydration product of setting cement has little opportunity to combine into stable compounds because of the absence of reactive low-lime alumina and silica constituents such as were often present in the older low-fired low-lime portlands; these could absorb and "mop up" excess lime.

In older hydraulic cements prior to the early portland, or partial-fusion cements, non-glassy reactive silicates and aluminates were also available. The presence of the latter insured the capture of free lime and its conversion to less reactive compounds over long periods of time. Thus, despite greater earlier strength and uniformity, or the modern use of air-entraining agents, reactive lime continues to be an unwanted by-product of cement hydration. Whether this lime is damaging to the concrete or not is generally out of the jurisdiction of the cement producer; it becomes a factor for the concrete design engineer or architect to take into account.

This so-called free lime or calcium hydroxide may be formed, for instance, when tricalcium silicate hydrates to a lower calcium form of hydrous silica. It may also be a residual product from the burning

buffered concrete opportunities

process in either the oxide or hydrate state. As this lime ionizes and goes into solution, it will combine with various magnesium or sodium sulphate salts or acids that may be present in soils; it may be reactive to atmospheres of exhaust gases from products of combustion, sewer, and industrial wastes, and to sea water sulphates; or it may combine with reactive alkalis present in some cements or aggregates.

The resulting chemical reaction products may, in certain cases, have destructive or bond-weakening effects within the concrete. These compounds may cause disruptive expansion due to formation of calcium sulpho-aluminate from tricalcium aluminate, lime, and sulphates. Disruption may be from pressure of gypsum crystal growth, resulting from free lime and sulphate reaction in the pore space of the concrete. (This mechanism should not be confused with any free lime CaO or MgO that may exist in the original cement or clinker, which upon slaking will expand to the greater volume of the respective hydroxides.)

Depending on the brand or type of cement, as much as 10 percent of calcium hydroxide by weight of the original portland cement may be released into the concrete pore water or pore space within the first month of setting and hardening. Very little of this quantity of lime is believed to contribute to the strength of the concrete. Because of its solubility, some of this lime may leach out of the concrete under moist conditions and with time, especially so in soft-water regions, and thus will affect adversely the permeability of the concrete. Obviously then, excess lime as such has no constructive place in the hardening mass of the cement-aggregate complex, unless it can be made to form further calcium silicate or aluminate hydrates to augment the other stable cementing compounds being formed.

Aside from this unwanted "lime villain" released by all modern general-purpose portland cements, variable amounts of more or less unwanted soluable alkalis of sodium and potassium also appear at times, which may combine (adsorb) with reactive silica hydrate in the aggregate to form gel layers of increased volume. If such reactions take place after the main hardening process has been substantially completed, disruptive cracking may result. The limitation of total alkali to less than 0.6 percent NaO equivalent in so-called low-alkali cements has added a safety factor. However, the added cost and the inability of some manufacturers to produce such types does not make this an ideal solution.

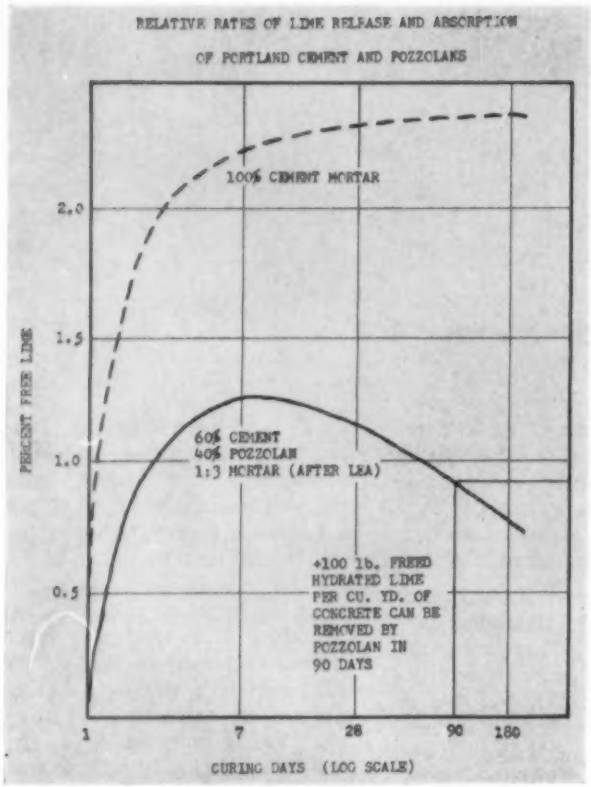
Neutral Cements and Universal Concretes

Obviously the industry can be proud of the many excellent concrete structures built with modern general-purpose portland cements. Thousands of instances illustrate the fact that under specified conditions of materials and handling techniques few problems of chemical instability or physical shortcomings have resulted after many years of service life. However, it is impossible to design and produce foolproof all-purpose concretes and their products with our present limited standard cements, because of the following considerations:

(1) Cements are produced from hundreds of minerals and compounds in all states of geological and chemical transformation; (2) various techniques of sizing, grinding, burning, cooling, classifying, and degrees of control are employed; (3) free lime, alkali, and tricalcium aluminate contents of Type I portland cements can approach collective critical values when used in concrete exposed eventually to moisture and water containing sulphates; (4) aggregates are made up of particles which can become standard in physical, or mineralogical makeup from region to region; and (5) no one can foresee all the many deteriorating influence that a structure above or below ground may eventually be exposed to in our changing civilization.

To add more classifications and types of cement, or to increase the number and reduce the range of aggregate specifications, is not the ideal approach toward simplification in an already complicated field, nor is it conducive to lowering costs. Were it possible for every cement manufacturer economically to produce a general-purpose cement of adequate strength which would not contain or release calcium hydroxide or a critical excess of soluble alkalis, a very marked increase in chemical resistance would be gained for concrete over a wide range of applications and field conditions. Such a cement, if available everywhere to both large and small user at no price premium, would, no doubt, be received with broad acclaim by the ultimate user of concrete products.

When a need arises, there is generally a striving for fulfillment. The cry for rapid strength and "pure" cement has already been oversha-



dowed by the demonstrated concrete improvements achieved with many kinds of "doctored" cements and blends; and the employment of air-entraining agents and pozzolans for special cases—and even general use—is becoming established practice both here and abroad.

Seldom has a material in industry been so greatly needed and also made so readily and economically available by nature or by-product as the lime-eliminating reactive materials we call pozzolans. By the same token, seldom has such a material been grouped and identified with a more dangerously oversimplified singular name, such as the designation "pozzolan" would suggest. All pozzolans will, more or less, "mop up" the free lime present or released by the portland cement.

However, the fact that many of these pozzolans can be treated to act in addition as stabilizers for excess soluble alkalis released from either or both the hydrating cement or the wetted aggregate, further enhances their ultimate value; and this fact fulfills even more their potential role of helping eventually to achieve a universal safety cement for concrete of utmost permanency in general use. The relative rate and efficiency with which a pozzolan can reduce the inevitable lime content from concrete made with general-purpose cement is shown in Figure 1. It should be further noted that chemical stability in a concrete or mortar is gained not only through removal of reactive lime, but evidently also through the mechanism of shielding and inactivating reactive aluminum hydrates which become film coated or encased by the stable gels of pozzolan-lime-silicates.

World-Wide Interest in Pozzolan No one material in this complex chemistry of hydraulic cementing reactions can ever be considered a cure-all. However, nothing so far has come along, either in cement manufacture or concrete additives, that can match the growing success story of properly applied pozzolans to special and general-purpose concrete and its products. To the writer, this relatively recent and widespread interest and research activity into pozzolan buffers reveals an apparent dissatisfaction with today's general-purpose concretes under other-than-normal service conditions of exposure to chemical influences from outside, as well as from aggregate and cement sources.

Today's foreign technical literature consistently presents and discusses results of investigations on reactive silica materials with portland cements and concretes made in European, Russian, and Asian laboratories. Recently a South American client informed the writer that the use of activated shale pozzolan was, as a matter of fact, an established practice in his country. In Mexico, portland-pozzolan cements are employed increasingly to produce buffered concretes for general construction. In Sweden, the prevalence of soft water has increased the use of pozzolan buffers in general concrete work. In Italy, where the stability of pozzolanic concretes has been so graphically demonstrated by remnants of Roman structures which are still sound, more than 75 percent of all concrete and mortar contains pozzolanic ingredients for well-proved reasons.

Extensive trass beds along the Rhine river in Germany have served as hydraulic cement materials, with lime, for long periods in history. Today this trass in finely ground and closely controlled form finds extensive use as a pozzolan, and serves as a recognized and valuable tool in modern German concrete technology. The extensive use (40 percent of all portlands) of blast-furnace slag cements in that country for modern chemically-buffered concretes speaks eloquently for the high esteem in which the lime-stabilizing action of German slag pozzolan is held.

In the United States, too, stepped-up search and evaluation of pozzolan raw materials is being carried on by the portland cement industry, the Bureau of Standards, the Bureau of Reclamation, and various independent producers, such as those marketing fly ash in the East and Midwest.

Climate for Establishing a National Pozzolan Industry

A number of factors contribute to the sound establishment of a new industry of this type, for example:

1. The potential market area should be widespread, and the product should find eventual use in many further applications, indicated now by research findings only.

2. The raw material distribution should be extensive on a geographical basis to serve the market areas.

3. The product for this market should lend itself to accepted standards, with the minimum of subclassifications.

4. If the product is used by an intermediate-process user, its use should be based on quality improvements in the field of its applications, and preferably on economic factors as well.

5. The use of the product should produce beneficial results in its end use to the final user on the basis of quality and economy.

6. There should be an ample profit margin and adequate returns on plant investment for the supplier-producer, without dependency on high tonnages.

Markets, Present and Future Today there is a branching out from the more established uses of pozzolans in massive types of concrete work, such as for dams, to other hydraulic construction—tanks and basins, reservoirs, irrigation and water supply canals and conduits, sewer pipes, foundations and footings in sea water and acid soils, highway and bridges where aggregates are of questionable stability, pumping and grouting mixes and oil well cements, and general low- and high-pressure steam-cured concrete products.

In many of these newer general-purpose applications it has also become evident that buffering benefits are not necessarily those sought through the addition of pozzolans to the concrete and mortar. Just as important are the improvements and beneficial characteristics these pozzolans impart in the matters of plasticity and workability, reduction of bleeding and aggregate segregation tendencies, watertightness or permeability, steady strength gain without retrogression, and lowering of heat of hydration. Last, but not least is the fact that their use often results in a cost reduction of the cementing material portion of the concrete, especially if a large job is involved.

As we apply our research efforts further in this field, distinct possibilities will undoubtedly appear for speeding up the reaction rate of certain pozzolans with lime, perhaps to a point where the combination rate keeps close pace with the calcium hydroxide release rate in the first few days of cement hydration and setting. (Note the cement curve in the accompanying figure.) Such a development could conceivably have far-reaching effects on the whole process of cement making.

When pozzolans of many kinds become more and more available, there may well come a time when such materials will be manufactured in a wider particle-size range to form controllable fines-fractions for any concrete aggregate mix design. It would not be too difficult to visualize a "pozzolan aggregate" product which, when incorporated into a concrete aggregate short of adequate fine sand and fines, will physically augment and cement, as well as chemically buffer, the resultant concrete.

Raw Material Distribution While in the past pozzolanic raw materials have been associated with the volcanics (tuffs, scorias, pumicites, ashes, etc.) of the West and Southwest, and the artificially formed fly ashes and quenched blast-furnace slags of the East and Midwest, today it is realized that many of the universally-occurring sedimentary deposits will become of ever-increasing importance as pozzolan sources.

As the various beneficial effects of pozzolans in concrete become more generally appreciated, a great deal more of concerted search and evaluation of suitable raw materials will be initiated in every section of the country. In view of the great geological and mineralogical variety of pozzolanic raw materials, it would be strange if suitable deposits were not eventually found and recognized in every state in the union. Thus the second requirement for a new industry—namely, raw material availability—should eventually be met without difficulty.

Product Standards The term "pozzolan" is still a singularly inadequate and misleading name or designation as used today by the uninitiated or by the would-be producer having no technical background in the field of evaluation and processing. To designate so many types of lime-reactive materials by one single and all-embracing name can only lead to precarious oversimplification of a complex group of materials and their use. If today we speak of portland cement in a technical sense, we qualify such cement according to its type composition, from I to V by its less common variations, such as low-alkali or white portland; by its blends, such as pozzolan, blast-furnace-slag, oil-well, or masonry cement; or by its modifications with additives for waterproofing or air entrainment; or any combinations thereof. If we do not speak of portland type cement, then we further classify the hydraulic cements as alumina cement, slag cement, or natural cement.

Today's several processed natural and artificial pozzolans are fully as varied in chemical and mineralogical composition as any of the aforementioned classified cements, yet they are all identified under the material name of "pozzolan" without a further qualifying designation. The term "pozzolan" should, however, be actually considered a *group name* just as the term "portland" is used to designate a special group of hydraulic cements. The general user will not be interested in the raw material source or type, but rather in the guaranteed performance and properties of the finished product. Thus a pozzolan industry, too, will need a classification of its various pozzolans within restrictive performance tests.

It is therefore appropriate to discuss, even if somewhat superficially, some of the problems a new pozzolan industry will face in standardizing its products for the most efficient use of the technical and non-technical user alike.

The affinity of any one pozzolan for calcium ions is basic by definition, but it does not necessarily extend to an affinity for sodium or potassium ions. It is more than likely that the minerals and compounds in a pozzolan that are responsible for neutralizing dissolved alkalis are not those which combine with lime. The writer has found in

the case of a number of pozzolan types that a non-activated or low-heat activated pozzolan produced excellent strength with lime without reacting with soluble alkalis, yet also became alkali-reactive upon subsequent or further heat treatment at higher temperatures, longer treatment cycles, or under changed atmospheric or gas-partial-pressure conditions.

This has also been observed by others through relative alkalinity tests in earlier extensive investigations. It is therefore not surprising that certain pozzolonic raw materials may be heat-activated selectively, depending on whether the product is designed to serve as a maximum constituent in the concrete, due to its high strength, or whether it has as its primary function the job of buffering the concrete against alkali or sulphate attack.*

The point we wish to make, therefore, is that eventually quantitative values should be established which will separate finished pozzolans at least in two major reactivity classes, and additionally assign to them index or modulus ratings for technical concrete design evaluations. It will not be the purpose here to offer solutions, but rather to stimulate and provoke early thinking along several lines of approach.

An all-purpose pozzolan would obviously be one of "balanced" components which would react to neutralize, stabilize, precipitate, and cementize any of the common detrimental soluble salts, weak acids, and alkalis to which concretes in general may be exposed within their service life and conditions. If, then, such an all-purpose or buffer pozzolan is properly classified and produced as such, it could be specified with general-purpose Type I portland cement (with or without AEA) *from any source*, and used with physically suitable aggregate *from any source* for the production of a durable, high-quality concrete of low permeability. It would then remain for the user to ascertain the optimum cement-to-pozzolan ratio for the most economical mix design consistent with the degree of chemical resistance sought.

Pozzolans reactive only to lime may be termed "limited-purpose" or "limited-buffer" pozzolans. Such materials, while limited to normal low-alkali cements and non-reactive aggregates, may nevertheless benefit the concrete to the same degree in all other respects, although the chemical buffering extends only to the excess lime. As pointed out previously, however, this lime buffering will probably prevent physical and chemical leaching by virtue of concrete pore-filling or densification effect and the sealing mechanism obtained through formation of stable calcium silicate and aluminate precipitation.

Aside from present specifications for portland-pozzolan cement, Tentative A.S.T.M. Specifications C350-57T for fly ash pozzolan and C402-58T for natural raw or activated pozzolans as yet provide no pozzolan identification and classification based on their use with various cements or for various specific purposes, although additional testing for chemical buffering action is suggested. Eventually we will probably need a high and low efficiency rating or class in both the limited-buffer and the buffer pozzolan group.

Massive and important concrete structures are probably designed under very rigid specifications, with thorough composition and with safety factor allowances for possible adverse field conditions. Thus concrete mix design engineers and cement-supplier chemists can arrive at certain safety adjustments and threshold values to meet the proposed chemical stability goal with maximum assurance and economy. Moduli for preliminary examinations of cement mineral- and liquid-phase components may be used to allow the selection of a cementing mixture for maximum concrete inertness or durability. For example, a modulus (after Meier-Grolman)

$$\frac{C_3S + C_2S + C_3AF}{\text{free } CaO + C_3A + K_2O + CaSO_4}$$

shows that the unstable reactive compounds in the denominator are offset by the less soluble, stability-

TYPES OF

A.S.T.M. Designation	Portland Cements				
	High-early Strength III	General-Purpose I	Moderate Heat- & Suphate-Resistant II	High Sulphate-Resistant V	Low Heat of Hydration IV
Fineness (sq. cm./gr.) (−326 mesh)	+2800	2800	2800	2800	2800
28-day Strength p.s.i.	+3500	3500	3500	3000	2000
Autoclave Expansion (Free Ca0 + Mg0)	0.5	0.5	0.5	0.5	0.5
Relative Chemical Inertness	low	low	medium	medium to high	medium
Example of Meier-Grolman Modulus (Basis of Bogue Composition)	4.5	4.5	7.3	9.8	7.5
Use Characteristics	Generally available high-strength cements for general construction purposes			Not generally available cements for special purposes	

*The reader is referred to the reactivity table prepared by the writer for various pozzolan matrial types in Part I of *Technical Considerations in Natural Pozzolan Production*, PIT AND QUARRY, October, 1954.

producing compounds in the numerator, and that therefore a cement with a high index ratio within any one type is chemically more resistant than one of low modulus value. (On the basis of the types of cements themselves, Type III portland is obviously on the low index end, along with Type I. Types IV and V show high numbers, as do also the slag, iron, and alumina types, with their lower tricalcium aluminate [C_3A] contents.)

It has been shown that high modulus indexes of this type have correlated well with subsequent field and test results in the matter of resistence of concretes to sulphate water deterioration. Table I shows the approximate degree of resistance of cementing materials in this respect. It can be seen, for instance, upon examination of the modulus relationship, that any particular brand of cement especially low in C_3A may contain a greater allowable amount of free lime, and *vice versa*.

For the interest of the technical reader, it may be pointed out here that this chemical resistance modulus for cements (with slight modifications from added constants applied to the alkali and C_3A) can be put to practical use, according to German cement technologists, and that the theoretical (non-glassy) compound composition, as computed from the oxides by the Bogue method, correlates quite well with those found by microscopic analysis or values established by Dahl. Thus the index number derived from this modulus provides a simplified method for evaluating the resistance to aggressive influences.

Such a modulus is here discussed to point to the possibility of an eventual establishment of a "buffer-modulus" for pozzolans which can be applied (added numerically) to the chemical-resistance modulus of any type or brand of cement for the production of an adequately buffered universal-type or special-type concrete. Such a buffer modulus for all-purpose pozzolans may equate a number of chemical reactivities to a quotient index number.

Many investigators have attempted to develop simple or single chemical or physical tests for evaluating pozzolanic activity. However, results have not always correlated 100 percent with subsequent field condition tests on the concretes. Since pozzolans have, in the past, been primarily used for "special buffer" rather than "general buffer" quality concrete, a single test will not be adequate for future classification. It would seem, nevertheless, that it should be possible to evolve a buffer modulus or index that would incorporate the various chemical buffering characteristics of a pozzolan into a single quotient value similar to the chemical-resistance modulus discussed for portland cements. Obviously it will be impossible to relate chemical or mineralogical composition to pozzolan reactivity in view of the many compounds involved, and because of the fact that even those numerous compounds are themselves in vari-

(*Continued on page* 101)

TABLE I
AMERICAN HYDRAULIC CEMENTS

Blended Portland Cements									Slag Cements		Natural Cements		Masonry Cements	
Air-Entrained			Slag (Blast-Furnace Pozzolan)				Pozzolan (Non-Slag)						For Mortar	For Masonry
IIIA	IIA	IA	IS + IS (MS)	IS (MH) + IS (MH-MS)	IS-A + IS-A (MS)	IS-A (MH) + IS-A (MH-MS)	IP	IP-A	S	SA	N	NA	II	I
+2800	2800	2800	3400	3400	3400	3400			4700	4700	6000	6000		
			12%	12%	12%	12%	12%	12%					15%	15%
											1000	1000	900	500
+2800	2800	2800	3500	3500	2800	2800	3000	2500	1500	1000				
0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.5	0.5	.05	0.5	0.5	0.5	1.0	1.0
low to medium			high	high	high	high	med. - high		med. - high		med. - high			
			+15											
Equivalent cements of lower strength producing higher freezing and salt resistance and better workability			Cements of about equivalent or higher strengths at later ages, producing greater chemical stability and resistance in concretes of lower heat of hydration, lower permeability, and better placement characteristics						Moderate-strength cements of quenched slag plus hydrated lime		Moderate-strength cements of calcined high silica alumina limestone		Low-strength, slow-setting cements of high plastic blends from any cements, pozzolans, lime, inert minerals	

N.S.A. Plant Operators Analyze

By BUREN C. HEROD

The program and locale combined to draw a record attendance to the annual meeting of slag plant operators in Niagara Falls.

ANOTHER ON THE SPOT REPORT

PARALLELING the intensive activity of the locale in which the National Slag Association plant operators held their 1959 meeting —Niagara Falls, N. Y., is the scene of tremendous construction projects —a comprehensive program was scheduled on production problems.

This meeting, held on April 21 and 22 at the Treadway Inn, not far above the falls, was based on an agenda which, as in preceding years, incorporated subject matter submitted by the operators and regarded by them as of particular significance in their respective plant operations.

Gerald S. Snyder (Buffalo Slag Co.) presided over the various sessions of the program, which was correlated by L. L. Warren (Vulcan Materials Co.). Mr. Snyder's firm also hosted the group for an evening reception and dinner, a luncheon for the several ladies present, and a tour of the huge aggregate plant supplying the Niagara Power Project construction.

The varied topics scheduled for discussion had been previously distributed to the members, who were therefore prepared when they came to the meeting to present pertinent data on individual experience. Among the several subjects considered were: effectiveness of impact-type crushers on reduction of both air-cooled and lightweight expanded slags; methods of producing and mixing or blending various slag fractions in making a dense-graded

Production Problems——

exchange ideas on crushers, controls, safety measures, automation, alloys

aggregate; feed-back controls; safety in ladle pouring operations; automatic *vs.* manpower requirements; slag washing; improvement in permanent magnets; watering of furnace pits; and preventive maintenance on chutes, scales, conveyors, and crane buckets.

Again for this plant operator meeting, a guest speaker was invited to address the group at a luncheon gathering on a subject applicable to the industry. The topic discussed by A. K. Raney, application engineer, industrial engineering section, General Electric Company, dealt with automation as applied to the mineral aggregates industry.

Mr. Raney stated that although automation means many things to many people, the basic approach in any case must include an analysis of the plan or flowsheet of a given operation and the problems relative to any particular phase.

Among the most important physical features in an automated facility are sensing devices, the speaker said. These would include such units as closed-circuit TV, material level indicators, metal detectors, tonnage recorders, etc. In effect, it was noted, an automated operation is comprised of a process loop and a monitoring loop. There may be more than one combination of these in an industrial facility; and as an added refinement, a computing phase may be provided between the data logging and programming steps.

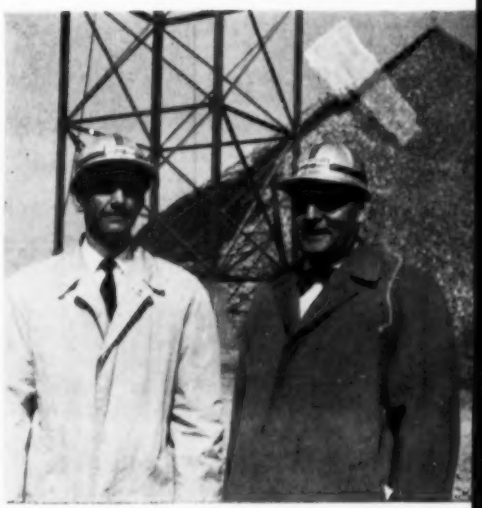
Despite the impressive degree of automation which it is now possible to attain, human intelligence is required for the interpretation of many factors in any given operation.

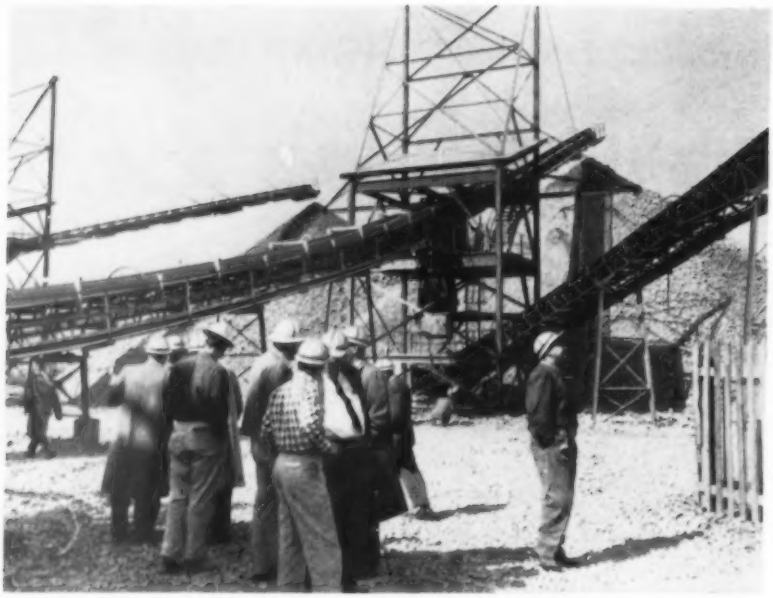
In the discussion periods devoted to day-to-day problems, several interesting points were brought by the operators—and most of them generated enthusiastic exchanges of ideas. Perhaps one of the greatest assets of the meeting was the fact that there were differences of opinion on the approach to various problems—a situation that fomented critical and beneficial analysis of the factors involved in each case.

On one virtually universal problem, abrasion of equipment, the statement was made that the hard crystals in steel plate have the greatest bearing on the capacity for wear resistance. These crystals must be harder than the slag being processed—a point that is also true

Left: L. L. Warren, left (Vulcan Materials Company), was program chairman, and Gerald S. Snyder (Buffalo Slag Company) general chairman of the meeting. Mr. Warren succeeded Mr. Snyder to the post of general chairman for 1959.

Right: W. E. McDermut, left (Illinois Slag and Ballast Co.), and Ed Bauman, N.S.A. managing director. Mr. McDermut is program chairman for the coming year.





Some of the N.S.A. members are seen here during their tour of the outstanding 2,200-t.p.h. crushed stone plant of Channel Constructors near Niagara Falls.

with respect to hardsurfacing rods.

In a discussion on abrasion-resistant alloys, one operator noted the apparent superiority of work-hardened manganese, and indicated that shot-peened manganese was even better. Experiments with applications of T1 steel were described as gratifying, and at least in the instances noted, proved to provide better wear in the same use than did alloy steel.

Fine points involved in controlling feed for most efficient crusher operation were scrutinized. It was brought out that a change in the average size of material fed to a particular reduction unit should be accompanied by resetting of the feeder. The latter step should be considered in the light of such variables as coarseness, fineness, and moisture, it was suggested.

Safety precautions pertinent to the operation of pouring slag from ladles were discussed at length. The use of hydraulic-electric remote control for tipping ladles eliminates the need for a man near the discharge area. Inspection of ladles during filling to check on iron content, and breaking the top crust, if one is present, before dumping are major factors in minimizing explosion hazards.

On the subject of permanent magnets, it was evident that there is some thinking to the effect that a magnet suspended above a conveyor discharge point serves the purpose of metal collection better than a magnetized head pulley. It was also stated that on larger feed, *i.e.*, ½-in. plus, a magnet operates more efficiently.

A spirited discussion of the *pros* and *cons* of various types of front-end loaders brought out significant comment. While a particular loader may be doing a yeoman job for one producer and an identical unit may be falling far short for another operator, it was emphasized that any one of the different makes is only as good as the availability of parts and service.

In accord with precedent, L. L. Warren (Vulcan Materials Company), who was program chairman for this meeting, was nominated and elected to the general chairmanship for 1959. W. E. McDermut (Illinois Slag and Ballast Company) was named program chairman.

During the afternoon following the final discussion session, the group toured the 2,200-t.p.h. crushed stone plant of Channel Constructors near Niagara Falls. This impressive operation, which the slag producers found interesting in every detail, is supplying all aggregates required in the construction of the huge hydro-electric project.

The first annual Bituminous Concrete Plant Mix School was held recently in Raleigh, N.C., under the auspices of the Carolina Asphalt Association. The five-day program covered problems of building and maintaining streets and highways, with emphasis on quality and cost control.

Missouri Portland Cement Company board of directors proposed a two-for-one stock split at the company's recent annual meeting. Stockholder approval of a change in authorized capital from 1,000,000 shares of $12.50 par value to 2,000,000 shares of $6.25 par will be asked on June 30. If the two-for-one split is approved, it will be effective about July 31.

Gibbar Brothers Limestone Company, Perryville, Mo., has moved its mobile rock crushing equipment to a new 20-acre site near Jackson, Mo., which reportedly has a quarry potential in excess of 600,000,000 tons. Analysis of the stone shows 98 percent pure calcium content. Gibbar specializes in agricultural limestone.

Forecast of a 20 percent increase in the per capita consumption of cement in the West by 1969, was made by Kenneth Conningham, assistant to the general manager of Permanente Cement Company at a recent meeting of Security Analysts of San Francisco.

The Arkansas Cement Corporation, Little Rock, Ark., a subsidiary of Arkansas-Louisiana Gas Company, has recently become a member of the Portland Cement Association. The firm has completed construction on a 1,400,000 bbl. plant at Foreman, Ark.

Net earnings of the Missouri Portland Cement Company for the first quarter of 1959 were virtually tripled as compared with the first quarter of 1958. Earnings reached 66 cents per share.

(From page 97)

ous states or stages of decomposition and reactivity through degree of weathering, geologic age, or artificial heat treatment.

Thus we would be forced to relate various numerical test results on the basis of chemical-physical changes produced by pozzolans in any particular or standardized cement-mortar or cement-concrete mix. In the following relationship, any two or more of the given (or other) values may make up an eventual buffer-modulus for pozzolan classification. Thus, buffer-modulus=

Coming Role of Pozzolans

$$K \times \frac{\left(\begin{matrix}\text{lime}\\ \text{absorption}\end{matrix}\right)+\left(\begin{matrix}\text{insoluble}\\ \text{residue}\end{matrix}\right)+\left(\begin{matrix}\text{leaching}\\ \text{resistance}\end{matrix}\right)+\left(\begin{matrix}\text{alkalinity}\\ \text{reduction}\end{matrix}\right)+\left(\begin{matrix}\text{alkali-expansion}\\ \text{reduction}\end{matrix}\right)}{(\text{weight loss due to sulphate action}) \quad + \quad (\text{permeability})}$$

Any one or more of the given values in either numerator or denominator may be multiplied by a suitable constant in order to properly and proportionally account for each contribution to buffering efficiency in universal or special concrete use.

Once such a buffer-modulus is established, it is conceivable to use the chemical resistance modulus of any particular type or brand of cement, add to it the buffer-modulus value of any particular pozzolan, and come up with a blend-modulus which will be either above or below a dividing index value for chemically stable or unstable universal-use concrete. It would not be too difficult a research project to evolve such a usable index modulus for pozzolans.

A second or higher index value or limit for a blend-modulus may be necessary for special-purpose concretes resistant to moderate acids, for example. If, for instance, this higher index limit cannot be reached with the summation value of a low-index Type I portland cement and a high-index pozzolan, the higher index of a Type II portland may be needed to achieve the higher chemical inertness required, and thus do the job. With a low-index pozzolan, it may be necessary to use a Type IV or V portland to reach the required extra-high index value. If a low-index pozzolan produces exceptionally high strength, it may be used in larger quantities and with less cement in the concrete, thus providing the resultant high overall buffer-index required.

In any case, research along this line should produce helpful data toward the goal of producing and pre-estimating the degree of chemical stability or resistance in all general concretes about which there maybe the least doubt as to later possible chemical aggression from any source.

In Part II of this series we will discuss points 4 and 5 involving some of the problems and rewards connected with the use of pozzolans, as well as the establishment of a pozzolan supplier industry.

Brazilian Power Plant Project Buys $250,000 Crushing Plant

Central Electrica de Furnas, S.A., presently constructing a large federal hydro-electric power plant on the Rio Grande River in the state of Minas Gerais, Brazil, has ordered an Allis-Chalmers aggregate crusher.

All of the crushing plant equipment, costing more than $250,000, is to be supplied by Canadian Allis-Chalmers, Limited, due to import license requiring shipping all of the material from one country.

Universal Atlas Cement Plant Gets $300,000 Filter System

Construction has begun on a $300,000 ten-story Fiberglas dust-filtering system at the Northampton, Pa., plant of the Universal Atlas Cement Division, U. S. Steel Corp.

The new collection unit, to be installed on the No. 2 kiln, will contain 540 bags, each 25 ft. long and 11½ in. wide. Dust collection will be accomplished in two stages: gas from the kiln will be pre-cleaned by mechanical collectors (which allow about 75 percent dust removal), and the new system will complete the process.

When the installation is completed late this year, the electrostatic precipitator collecting unit serving No. 2 and two other kilns will be continued to be used for the latter.

Stockholders of the Kaiser Aluminum and Chemical Corporation and of the Mexico Refractories Company of Mexico, Mo., have approved the proposed merger of the two firms. Mexico Refractories will operate as a division of Kaiser.

DONALD B. PIPER has been appointed to the newly-created post of sales manager, rock, sand, and gravel, for Pacific Cement and Aggregates of San Francisco. Mr. Piper joined the firm in 1943.

• Operations of Loring Quarries, Inc., at Bonner Springs, Kans., resulted in the development of the underground cold-storage plant shown in this picture. Beginning in 1951, worked-out space resulting from limestone mining was converted into a storage facility, which now has a capacity of 14,000,000 cu. ft. Loring's tightly-quartered site prompted management to try out two pivot-steer LeTourneau-Westinghouse D Tournapulls for hauling to the crusher. (One unit is here shown dumping.) Results were so successful that two more Tournapulls will be added soon.

Grinding Mill Load Controls Increase Output by 75 Bbl. per Day

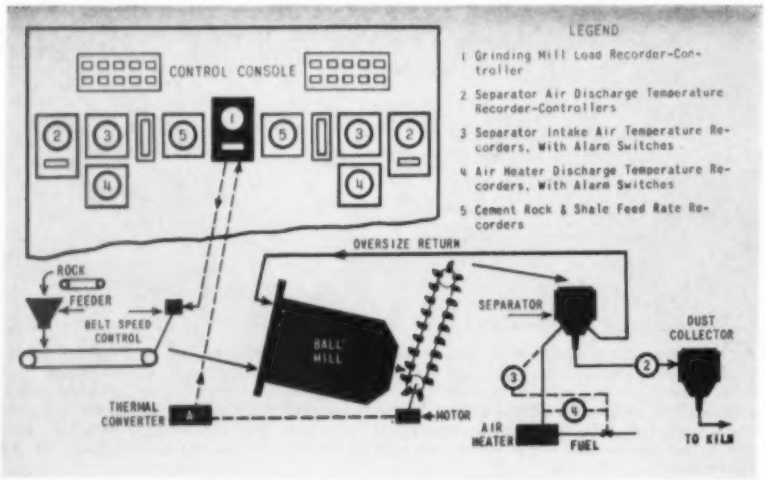
IN ITS modern, highly-automated plant at Speed, Ind., Louisville Cement Company uses electric load controls to maintain optimum grinding rates in the ball mills. One month after the start of operations with the new system the company's records indicated that mill output had increased by 75 bbl. per day. A closed-circuit, dry-grinding process is used, with oversize particles separated by air and recirculated, as shown in Figure 1.

The grinding mills are of the ball type, and are used for pulverizing both the raw materials (cement rock and shale) and the clinker from the kilns which produce finished cement. Fineness of grinding must be carefully controlled at both production stages to assure desired product properties such as time of setting, strength, and composition.

To solve the grinding mill control problem, company engineers worked with application engineers of Leeds and Northrup Company, who furnished the recorders and recorder-controllers shown on the control consoles in Figure 2. Analysis of the problem showed that the electrical load on motors operating the mill discharge elevators bears a direct relation to mill loading, and therefore to grinding efficiency. Since this was so, Leeds & Northrup engineers reasoned, why not use a measure of this load to control the mill feed rate and hence closely hold to the optimum mill loading?

Basic instrumentation selected consists of thermal converters as load-sensing devices, and Speedomax electronic recorder-controllers. Converters have long been used in the power industry; they measure electric power and supply the recorder-controller with a signal proportional to the measurement. They maintain their calibration with great constancy, and have a long history of dependability. The Speedomax instruments are also widely used in the cement industry for temperature, speed, and other conditions.

Fig. 1—Schematic diagram of raw grinding mills locates instrumentation for load control and associated measurements.



Description of Controls

At the Speed plant the controls for the two raw-material mills face each other, as seen in Figure 2. Controls for finish grinding are in another part of the plant. The raw-material mills are 13-ft. dia. by 16-ft. long units. Referring to Figure 1, automatic control of grinding mill feed rate involves three major components: (1) a thermal converter "A," which measures kw. load on the elevator motor; (2) a Speedomax H recorder-controller, which receives the converter's electrical signal and, through a motor-operated drive unit, regulates the speed of (3) the feed conveyor motor, "B."

The recorder-controller, identified as item 1 in Figure 1, has three-action "P.A.T." electric control; this includes proportioning, rate, and reset actions to maintain close automatic control at the desired grinding rate. Each ball mill has a dual set of elevators with a thermal converter on each; the electrical measuring circuit is so arranged that either converter can be connected to the Speedomax instrument, or both converter outputs can be averaged for mill load control.

Additional instrumentation included in the Louisville Cement Co. raw mix process is identified in Figure 1. Each of the two large ball mills has a dual set of elevators, air separators, and air heaters. Tem-

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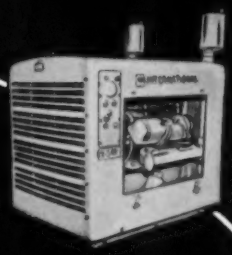

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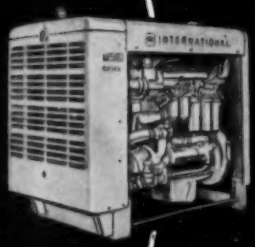

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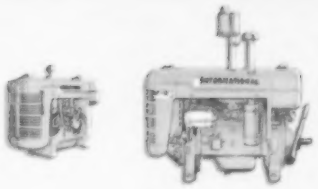

UC-60
16.5 max. eng. hp

UC-135
42 max. eng. hp

UC-221
75 max. eng. hp

UB-220
83 max. eng. hp

U-308
92 max. eng. hp

UC-263
95 max. eng

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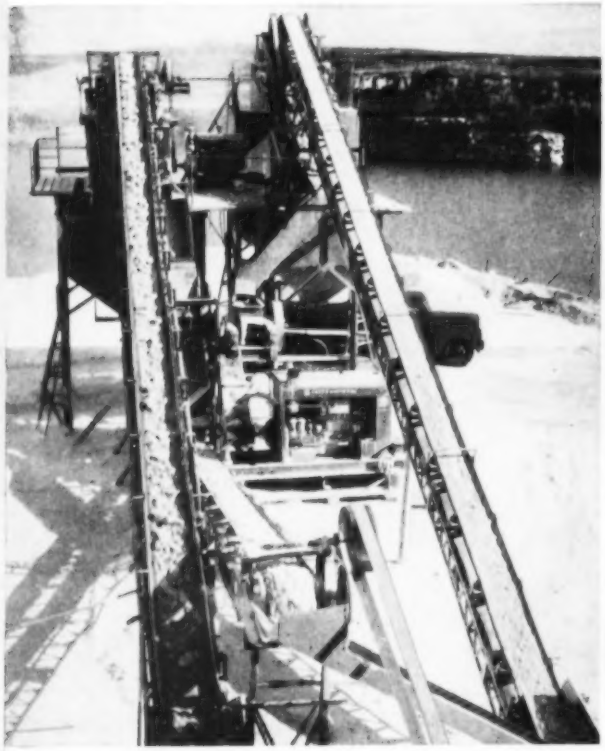
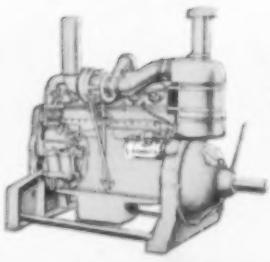


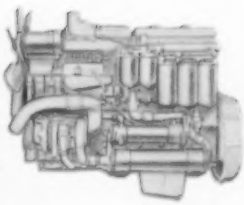
UDT-817
375 int. eng. hp

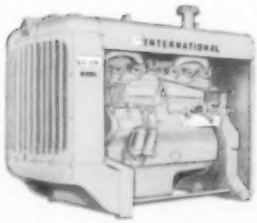
UDT-1091
265 int. eng. hp

UD-817
240 int. eng. hp

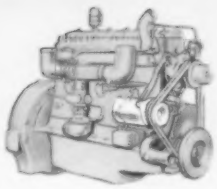
UD-1091
216 int. eng. hp



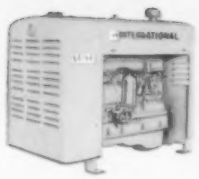




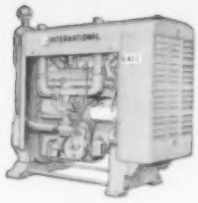
-263
max. eng. hp



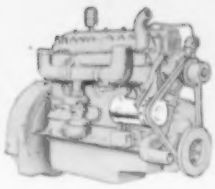
U-372
110 max. eng. hp



UB-264
112 max. eng. hp

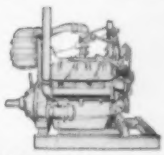


U-450
134.5 max. eng. hp

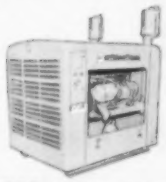


U-501
141 max. eng. hp

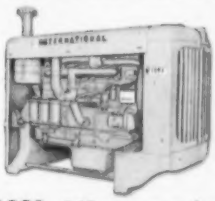
UV-401—**170 max. eng. hp**



UV-461—**179 max. eng. hp**



UV-549—**222 max. eng. hp**



U-1091—**248 max. eng. hp**
(nat. gas)

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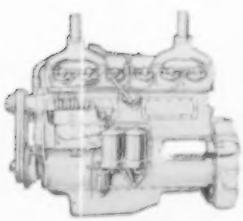
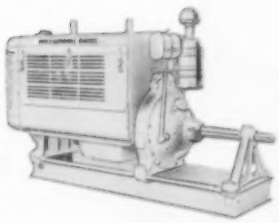
DIESEL

UD-236—**70 int. eng. hp**

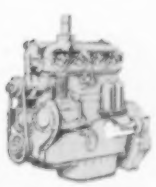
UD-554
140 int. eng. hp



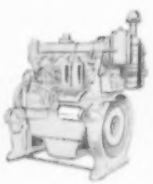
UD-18A
131.5 int. eng. hp



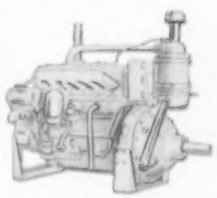
UD-14A
105 int. eng. hp



UD-370
95 int. eng. hp



UD-282
90 int. eng. hp



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FOURS	UC-60	2500	60	16.8		
	UC-135	2000	135	42	42	32
	UC-221	2400	221	75	75	66
	UB-220		220	83	83	70
SIXES	U-308	2400	308	92	96	82.5
	UC-263	2400	263	95	95	85
	U-372	2200	372	110	101	92.5
	UB-264		264	112	112	90
	U-450	2200	450	134.5	130.5	112
	U-501	2200	501	141	134	120
V-EIGHTS	UV-401	2800	401	170	165	142
	UV-461	2600	461	179	175	162
	UV-549	2600	549	222	215	192

DIESEL	MODEL	RATED RPM	CU. IN. DISPLACEMENT	MAX. TORQUE AND RPM	BORE X STROKE IN.	INTERMITTENT HP
FOURS	UD-370	2200	370	262 @ 1400	4⅝ x 5½	95
	UD-14A	1800	460.7	325 @ 900	4¾ x 6½	105
	UD-236	2400	236	173 @ 1800	$3^{11}/_{16}$ x $3^{11}/_{16}$	70
	UD-282	2400	282	217 @ 1800	$3^{11}/_{16}$ x 4.39	90
	UD-554	2300	554	400 @ 1300	4⅝ x 5½	140
SIXES	UD-18A	1600	691.1	473 @ 850	4¾ x 6½	131.5
	UD-1091	1500	1090.6	825 @ 1150	5¾ x 7	216
	UDT-1091	1500	1090.6	1000 @ 1250	5¾ x 7	265
	UD-817	2100	817	638 @ 1600	5⅜ x 6	240
	UDT-817	2100	817	1052 @ 1200	5⅜ x 6	375

NOTE: *For carbureted engines use 90% of max. hp shown for intermittent type application and 80% of max. hp for continuous type application. For diesel engines use 80% of intermittent hp shown for continuous duty application.*

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peratures as shown are recorded by means of thermocouples connected to panel-mounted Speedomax H recorders (instruments 2, 3, and 4). Recorders for separator intake air and air heater discharge temperatures have alarm switches which can shut off fuel to the heaters, in case these temperatures exceed a pre-set high limit.

Also mounted on the separate panels for each raw mix mill are two recorders (instruments 5) for the feed rates of cement rock and shale from storage silos. These devices measure the separate feed rates of these raw materials by means of tachometers on the respective conveyors.

Totalizing digital indicators on the consoles show the total amounts of feeds for production records.

Safety

The Louisville Cement Co. plant is not only ingeniously automated for efficient production, but it is also well protected for safe operation. A bank of panel alarm lights can be actuated by switches to indicate improper materials handling of solids flows throughout the plant. Ammeters on the panel indicate the current drawn by various motors and can detect overload conditions. Solids level indicators on the panel show levels of stone and shale in the silos. Combustion safeguards protect the air heaters. Finally, a 16-point Speedomax recorder continuously plots various bearing temperatures on the mill, feed journals, and air separators.

Fig. 2—The two raw material mills at the Louisville Cement Company plant have "mirror-image" matching consoles located on a balcony above the plant floor.

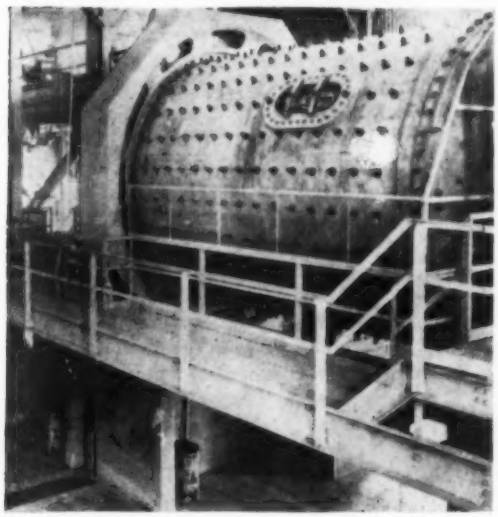


Fig. 3—Each of the two ball type grinding mills measures 13 ft. in diameter by 16 ft. in length and employs dual sets of air separators to classify the ground mix.

Fig. 4—Thermal converters are mounted in protective housing, together with other electrical equipment.

Modernization Plans Launched By Lime and Cement Firm

Three facilities of the Ash Grove Lime and Portland Cement Company, Chanute, Kans., plant will be replaced soon, according to Ira E. Barber, plant superintendent. Construction will be a modernization project and will not involve an increase in cement production.

Structures to be replaced include the raw materials storage building, the rock crushing plant, and facilities for receiving and storing coal, gypsum and shale.

Defensive Driving Booklet Issued by Natl. Safety Council

The National Safety Council has issued a new booklet to aid the professional driver, *A Professional Code for Defensive Driving*. "Defensive driving," according to the Council, "is a formula for avoiding accidents. It is a state of mind. It is the professional driver's safety code of the road."

The 20-page booklet is available on request from the National Safety Council, 425 North Michigan Avenue, Chicago 11, Ill.

HELMUTH KRARUP, veteran cement mill operator, died at his home in Encino, Calif., on March 21 at the age of 82. Mr. Krarup had formerly been plant manager of the Hawkeye Cement operation at Des Moines, Iowa, and prior to that had been engaged in a similar capacity at several of the Ideal Cement Company mills. As a younger man, Mr. Krarup was associated with the F. L. Smidth Company as an engineer.

New Market Development Featured

This interested group at one of the sessions includes Paul Sunderland (Ash Grove Lime & Portland Cement Co.) treasurer of N.L.A.; Wallace E. Wing (Marblehead Lime Co.); M. A. Rikard (Southern Cement Co.) president of N.L.A. In background is L. B. Ryder, Imperial Chemical Industries, England.

Charles E. Brown (Chemstone Corp.), who presided over one of the sessions; and one of the speakers, Dr. Ralph E. Grim of the University of Illinois.

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT REPORT

THE development of new markets for lime, and research to facilitate such development, were highlights of the 57th annual convention of the National Lime Association at the Homestead, Hot Springs, Va., April 6 to 8, 1959. The use of lime for stabilization of soils in highway construction was again given special emphasis because of its tremendous potential. Lightweight building units using lime, and the liming of lakes and ponds for fish propagation were also discussed. Reports were given on a new N.L.A. research fellowship on lime and clay mineralogy at the University of Illinois and on an investigation at the National Bureau of Standards of the variables involved in volume change of masonry.

After five years of meetings in California, Florida, Colorado, and Alabama, many welcomed a return to Hot Springs, where so many previous conventions had been held. It was announced that the Fall Operators' Meeting would be held at the Sheraton Hotel, Philadelphia, Pa., October 1 to 3, 1959. The 1960 annual convention will be at The Cloister, Sea Island, Ga.

Research programs under way on soil stabilization and volume change in masonry construction

at N.L.A. Convention

Association Activities In their annual reports on association activities, M. A. Rikard, president, and Robert S. Boynton, general manager of N.L.A., commented briefly on a number of important matters. The membership has increased during the last year to the point that it now represents 95 percent of the industry's commercial tonnage in this country. Treasurer Paul Sunderland reports that the Association is in good financial condition; its budget is at a record level, and the prospects for the industry are good.

The major staff project this year, said Mr. Boynton, is a detailed manuscript on the best construction procedures to be used in lime stabilization. This study brings all the latest information under one cover. The general subject of stabilization has also been well covered because of its importance. Excellent progress has been made and is expected to continue, but Mr. Boynton pointed out the urgent need for selling this procedure through the lime companies' salesmen and by hiring additional association field help. Mr. Boynton also stressed the fact that lime research expenditures, by companies and the Association, are far lower in proportion to sales than those of competitive industries.

Elections M. A. Rikard (Southern Cement Co.) was re-elected president for a fourth year, and John M. Junkin (Warner Co.) continues as vice-president. Reed C. Bye (Warner Co.) is the new treasurer, succeeding Paul Sunderland (Ash Grove Lime & Portland Cement Co.). Also re-elected were Robert S. Boynton, general manager; Georgia M. Coffman, assistant secretary; Kenneth A. Gutschick, manager, technical services; and Conard M. Kelley, highway engineer.

New members of the executive committee include E. D. Williams Jr. (H. E. Millard Lime & Stone Co.); James S. Offutt (United States Gypsum Co.). New directors are: J. M. Deely Jr. (Lee Lime Corp.); Charles A. Hartman (Peery Lime Co.); Stephenson Smith (Limestone Products Co.); V. F. Nast Jr. (Western Lime & Cement Co.); Paul La Liberte (Cutler-Magner Co.); George L. Scott Jr. (Alabaster Lime Co.); D. G. Ellis (West End Chemical Co.); J. F. Knight (Kaiser Aluminum & Chemical Co.); Franklin Witmer (Ohio Lime Co.); Kennedy Ellsworth (U. S. Lime Division); J. H. Robinson (Gypsum Lime & Alabastine Ltd.).

Safety Contest A feature of these annual spring meetings is the announcement of the winners in the Association's lime plant safety competition. According to Kenneth A. Gutschick (N.L.A.), 1958 was a good safety year, with 15 plants out of 45 entered achieving accident-free records; this is 6 more than in 1957 but 2 below the record set in 1956. These 15 plants are listed below in their contest classifications. All will receive N.L.A. Certificate of Achievement awards, and the winner in each class will receive a safety trophy at the Operating Meeting in Philadelphia.

A1—*Quarry with calcining plant working over 100,000 man-hours:*

1. U. S. Gypsum Co., Genoa, Ohio—404,154 man-hours
2. Ash Grove Lime & Portland

Left to right, two of the speakers, James L. Eades, N.L.A. research fellow at the University of Illinois; Frank Nichols, Virginia Highway Department; and George A. Ziegler (M. J. Grove Lime Co.)

The special certificates for exceptional safety records were accepted: for the U. S. Gypsum Co. New Braunfels, Texas plant, (2,000 days) by J. S. Offutt; for the Ash Grove Lime & Portland Cement Co. Springfield, Mo. plant (3,000 days) by Paul Sunderland; and for the Dow Chemical Company's Ludington, Mich. plant (2,000 days) by Kenneth A. Gutschick of N.L.A.

Cement Co., Galloway, Mo.—266,612 man-hours
3. Jones & Laughlin Steel Corp., Blair Limestone Div., Millville, W. Va.—136,409 man-hours
4. National Gypsum Co., York, Pa.—132,548 man-hours

A2—*Quarry with calcining plant working less than 100,000 man-hours:*

1. Marblehead Lime Co., Tooele, Utah—57,822 man-hours
2. Rockwell Lime Co., Manitowoc, Wis.—47,612 man-hours
3. U. S. Lime Products Div., The Flintkote Co., Nelson, Ariz.—20,298 man-hours

B—*Underground Mine with lime plant:*

1. Mississippi Lime Co., Peerless rotary plant, Ste. Genevieve, Mo.—277,927 man-hours
2. Marblehead Lime Co., Quincy, Ill.—49,763 man-hours

C—*Calcining plant only:*

1. Marblehead Lime Co., Thornton, Ill.—145,855 man-hours
2. Marblehead Lime Co., Hannibal, Mo.—96,128 man-hours
3. Marblehead Lime Co., South Chicago, Ill.—92,535 man-hours
4. Ash Grove Lime & Portland Cement Co., Springfield, Mo.—76,463 man-hours
5. Dow Chemical Co., Ludington, Mich.—76,002 man-hours
6. Kelley Island New York Corp. (Basic Inc.) Buffalo, N. Y.—59,975 man-hours

Special recognition was given the Marblehead Lime Co. for having all five of its plants accident-free, to the Ash Grove Lime & Portland Cement Co. for the long safety records of its two plants, and to the Dow Chemical Co. for its long record.

A new 3,000-day certificate was awarded to Ash Grove's Springfield, Mo., plant, which, as of March 31, 1959, had gone 3,336 days without a lost-time accident. A new 2,000-day certificate was received by tht New Braunfels, Tex., plant of the U. S. Gypsum Co. This plant's 2,193-day record ended last December. A 2,000-day certificate was also awarded to the Dow Chemical Company's Ludington, Mich., plant, which had 2,225 accident-free days, as of March 31.

Lime Stabilization The progress being made in the promotion of lime-soil stabilization was described by Conard M. Kelley, highway engineer for N.L.A. This practice is becoming more generally and widely known among engineers, highway departments, etc., and is being included in many specifications and manuals, along with competitive materials. The greatest use and best prospects are still in the state of Texas, but other states are using more, and the number of states interested is increasing. The F.H.A. is studying this practice, and the Highway Research Board is advising the states on its use.

Mr. Kelley told of one contractor who is so sold on stabilization that he is applying 1½ percent of lime on subgrades at his own expense in order to facilitate work on his jobs

Conard M. Kelley of N.L.A. discussing lime-soil stabilization with V. F. Nast and Fred Nast, Jr. (Western Lime & Cement Co.).

Two of the speakers: Donald E. Stingel, Union Carbide Olefins Co.; and R. L. Blaine, National Bureau of Standards.

Members of the N.L.A. staff, left to right: Kenneth A. Gutschick, manager of technical services; Robert S. Boynton, general manager; and Conard M. Kelley, highway engineer.

during wet weather. Mr. Kelley stated that jobs elsewhere are also being finished ahead of schedule, and he described the results obtained on projects in Louisiana, Mississippi, Kansas, etc. The use of this procedure in counties, cities, etc., should be watched carefully, he said, as the personnel are not familiar with the proper construction procedure.

Following this talk a color motion picture was shown illustrating lime stabilization progress on jobs in several states. Comments were given by Kenneth A. Gutschick, manager of technical services for N.L.A., who took the pictures. Shown first was the Bergstrom Air Base in Texas, the largest job of this kind, and one in Kansas, which used 5,300 tons of lime under concrete pavement. A project now under way in Mississippi in river-bottom gumbo illustrated how lime is used to do a difficult job under the worst possible weather and ground conditions. Also shown was a street paving job in Fargo, N.D.

A brief description of *Virginia's Experiences with Lime Stabilization* was presented by Frank P. Nichols Jr. of the Virginia Highway Department. A testing program there included lime, lime and fly ash, and portland cement on the same soils and under the same conditions. It was found that lime has an advantage over cement in subgrade use in that it does not set up so rapidly in case of unexpected delays. Lime-treated base materials can also be premixed and stockpiled for some time. In the opinion of Mr. Nichols, no stabilization is required for rigid pavements, but it is necessary for flexible pavements, especially where there is heavy traffic and soil conditions are poor. For base courses, cement or lime-fly ash are preferred for aggregates, but lime alone for soils.

Lime in Clay Mineralogy N.L.A. has established a research fellowship at the University of Illinois to study the function of lime in clay mineralogy. To report on this work, Dr. Ralph E. Grim, director of the U. of I. Department of Geology, and James L. Eades, the research fellow, appeared on the program. In explaining the complexity of the problem, Dr. Grim pointed out that two soils may have the same chemical composition but different physical properties, and *vice versa*. The same is true with particle distribution and physical properties. Slides were used to illustrate the atomic structure of the various minerals found in soils and clay and the effect of lime on each.

This research, said Dr. Grim, fits in with work being carried on at Illinois. It has been learned that the original structure of material determines what reactions will be. The temperature at which reactions take place can be increased or retarded by introducing traces of impurities, and other characteristics can be changed. It may soon be possible to predict on the basis of clay mineral construction what its reaction will be to lime. Also, said Dr. Grim, it may be much easier to identify such minerals.

Mr. Eades, who was formerly in

(*Continued on page 115*)

Left to right: One of the speakers, Karl Lagnefors, Swedish American Industries, Inc.; and Leslie Bere and John Wheeler (Ontario Building Materials, Ltd.).

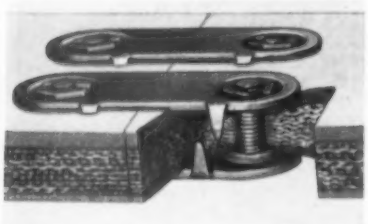
Life Expectancy of Conveyor Belts

some practical suggestions on the use of metal fasteners and splices

By MILTON BEACH
President
Flexible Steel Lacing Co.

IT IS estimated that between 80 and 90 percent of the conveyor belts in use in this country are joined with some type of metal fastener, i. e., compression, bolt-on plate, drive-on, or wire hook and rivet type. However, the most widely used is the compression type. This is particularly true in the sand and gravel, and crushed stone industries. For best operational results, meaning longer splice life and fewer shutdowns, belt maintenance crews should be instructed in selecting the right fastener size; they should know the most suitable metal to use for fastener plates, how to square belt ends for fastener application, how to make quick belt repairs, and how to practice preventive maintenance.

Fig. A—Cupped ends compress the belt to distribute the strain more evenly.



Compression Type Fasteners

As shown in the illustration, a compression-type fastener consists of two metal plates, bolts, and nuts. Cupped ends of these plates compress the belt to distribute the strain more evenly over the whole space covered by the plates . . . not just against the bolts alone. Two teeth on each side of the bolt are staggered to minimize swelling and to distribute further the pull on the belt. (See Fig. A.) This type of fastener makes an exceptionally strong, tight butt joint that permits the belt to trough naturally.

Separable belt joints, used exclusively on installations that utilize small pulley diameters, require another type of fastener—one that is hinged. (See Fig. B.) This design permits a separable joint, or splice, and facilitates removing or extending a belt quickly.

Variety of Metals Used

For service under conditions in which fasteners made of steel are not satisfactory, other metals are recommended. For example:

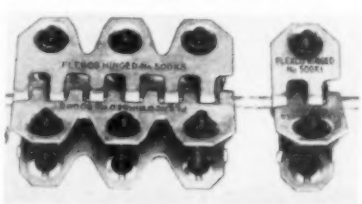
Stainless steel for general use wherever rusting is objectionable. It is resistant to some acids and has somewhat more resistance to abrasion than ordinary steel.

Monel — an alloy of nickel and copper; recommended for use wherever abrasion is severe and corrosion is a problem, inasmuch as it resists the corrosive action of most acids. (Monel is a product of The International Nickel Company.)

Everdur — a metal produced by alloying copper with silicon and manganese. This material is fully non-magnetic, which makes it desirable for use on magnetic pulley separator belts. (Everdur is a product of The American Brass Company.)

Promal — available only in the compression-plate type of fastener; it is used under conditions of dryness, and the material is highly abrasive, such as hot coke. Promal is a malleable casting especially heat-treated to give an exceptionally hard

Fig. B—A hinged fastener permits a separable joint and eases belt removal.



Can Be Increased

abrasive-resistant surface with a tough core. (Promal is the product of Link-Belt Company.)

Selecting the Right Size Fastener

As to the proper size of fastener to use on any belt, it is most important to follow the manufacturer's recommendations. Using a fastener that is too large causes breakage of the belt at the back of the joint. It is generally a good practice to use belt thickness as the governing factor in determining the size of the fastener to use. On belts that have excessively heavy rubber covers, fasteners should be mounted close to or on the carcass of the belt. Use rubber cement to protect the fabric from exposure to the elements or to the materials being conveyed. Sometimes a relatively thin rubber cover of the cold vulcanizing type can be used to protect the fabric.

Squaring Belt Ends

Belts that have been in service for several years often have worn and frayed edges. For this reason belt maintenance crews should, wherever practical, square the ends of all belts, new or old, with the center line of the belt . . . not with the edges.

The recommended procedure for squaring belt ends prior to the application of fasteners is to make all measurements from a center line extending 15 to 20 ft. from each end of belt. (See Fig. C.) Instead of simply drawing a center line with the belt edges as a guide, use the following method:

1. At intervals of 3 to 5 ft., mark center points in the belt width, using a light colored chalk or pencil.
2. Draw an average center line with these points as guides.
3. Use a large steel square to make the transverse line at a point at which the belt is to be cut.

Types of Belt Joints

The 90-degree butt joint is most commonly used. Here the squared ends of belts are brought close together (see Fig. D) and joined with metal fasteners. The manufacturer's instructions for applying the fasteners should be allowed.

Lap joint—Many sand and gravel and crushed stone plants use bucket elevators in their operations. Here again the 90 degree butt joint is recommended. (See Fig. D') However, the all too common method is to use a lap joint; that is, to overlap the belt ends and bolt them together. This method makes an exceptionally stiff joint and, unfortunately, causes bolts to "work" and sometimes break. Belt carcass is laid open to moisture, resulting in belt deterioration. Compression-type fasteners and the 90 degree butt joint have minimized this problem.

The 45-degree angle joint, using

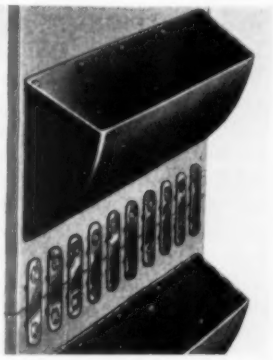


Fig. D'—A 90-degree butt joint is also recommended for bucket elevators.

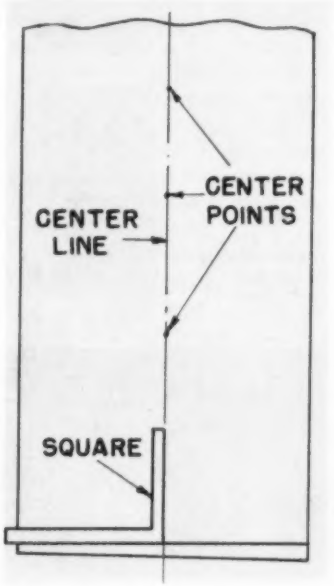
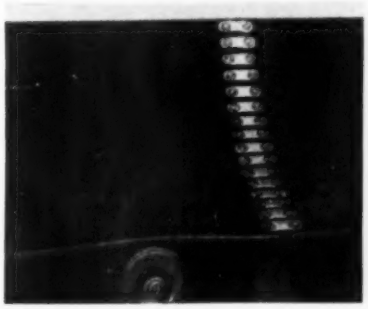


Fig. C—This diagram illustrates the measuring procedure for squaring belt ends before fastening.

Fig. D—The squared ends of the belt are joined by fasteners in this butt joint.



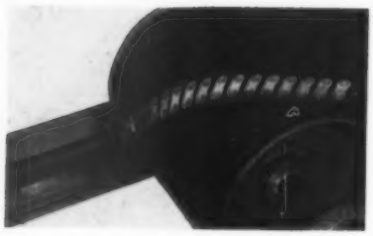


Fig. E—Plate type fasteners are used in 45-degree butt joints.

plate type fasteners, will operate over pulleys 25 percent smaller than the minimum sizes recommended for a 90-degree butt joint. (See Fig. E.) In addition to greater flexibility, 45-degree angle joints will lead better under scrapers, and will maintain a tighter butt joint than the 90-degree splice.

"Scraper plate" fasteners are used wherever plows or severe scraper operation causes excessive wear to the top plates.

The Wedlok splice, a new development for providing a high-tension mechanical splice with compression-type fasteners is a patent of the Raybestos Manhattan Company. This revolutionary new type of splice is designed for operating tensions up to 700 p.s.i. of width rating on belts of 5 or more plies and thicknesses of ½ in. and over. It consists of a V-shaped splice fastened with standard compression-type bolt and plate fasteners and special Wedlok tip and tail fasteners. (See Fig. F.) The use of the Wedlok splice effects substantial savings in labor, material, and shut down costs, when compared with a vulcanized splice.

Repair of Belts

Repairs can be made to holes, bruises, and rips through the hot vulcanization method. However, if time is a factor, quick repairs through the use of mechanical fasteners are effective. (See Fig. G.) If relatively large holes are found, it is not always necessary to cut the section out of the belt. Pads cut of the same belting can be used as "fill-ins" and applied with fasteners. Be sure that the fasteners running lengthwise of the belt movement are shorter than those placed across the belt.

A special fastener called a "rip-plate" has been developed for lengthwise rips in belts. It is especially recommended if there is a ragged tear or a heavy bruise. On clean, square tears, it is generally more satisfactory to repair with standard compression-type fasteners. If speed of repair is essential, a "drive-on" fastener can be used. (See Fig. H.) But here again, drive-on fasteners do not make as tight a butt connection in rips as compression-plate-type fasteners. Moreover, the latter type generally ensures longer repair life. Faster installation in emergencies is the principal advantage of "drive-ons." Manufacturer's recommendations for the type of tools to use in making repairs should always be followed carefully.

Preventive Maintenance

It is of prime importance to set up a program for regular, frequent inspection of all splices. Belts can then be examined at convenience, a better way than waiting until a breakdown occurs during production periods. Individual fasteners that show excessive wear should be replaced. Belt tension and starting tension should be checked to prevent premature weakening of splices. If a part of the belt appears to be running off the idlers in the vicinity of a splice, this may be caused by improper splicing in which the ends of the belt are not cut squarely. The best thing to do is to re-splice, using the center line method to square the belt ends.

According to leading conveyor belt manufacturers, cuts, tears, and other bruises open the way for grit to enter and cut fabric reinforcement. They let moisture penetrate and cause rotting of cord and duck. If the damage is not repaired in time, constant flexing and kneading of the belt on the idlers and pulleys gradually enlarges such damaged areas inside the carcass.

Careful examination of all fastener installations should be made periodically to make certain that no breakage in the carcass is occurring in back of splices. These and other checking suggestions make practical preventive maintenance rules. Observing such precautions will help you in making better, longer-lasting splices that will protect you from production schedule upsets.

Fig. F—This splice uses a V-shaped insert with special tip and tail fasteners.

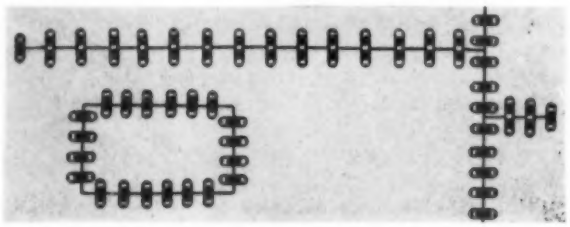


Fig. G—When speed of repair is a must, rips in belts may be quickly mended with mechanical fasteners.

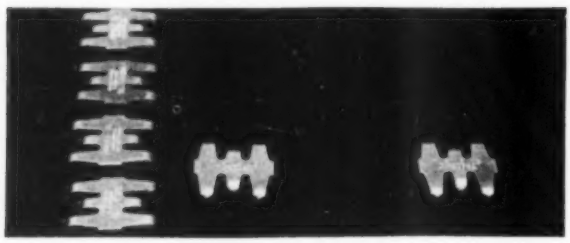


Fig. H—A "drive-on" fastener can also be used if speed is essential in making repairs.

N.L.A. Convention

(*From p. 111*)

charge of the soils section of the Virginia Highway Research Council, became interested in lime soil stabilization and its possibilities and worked on it there. His desire to do basic research on soil stabilization led him to accept this fellowship. Work was done first with pure clays as the basic material, and then progressed to more complicated soils. The necessary equipment for the 3-year program is now all on hand. Slides were used to show the effect of lime in 2, 4, 6, and 8 percent combinations and with various reaction times.

Volume Changes of Masonry Progress to date in the 3-year program of investigation of volume changes in masonry sponsored by N.L.A. was described by R. L. Blaine, chief of the Concrete Materials Branch of the National Bureau of Standards. Mr. Blaine is the inventor of the Blaine air permeability test widely used in the cement industry. He described the results obtained with a total of 96 small walls built of various combinations of brick and mortar since 1957. Regular and autoclaved brick and six limes with a range of autoclave expansion and with 1:1:6 and 1:2:0 mortar were used.

Two types of walls were built, both indoors and outdoors. Mr. Blaine believes that this study indicates that the variables involved in volume changes in masonry may include the brick, the type of mortar, the storage conditions, and loading, as well as the autoclave expansion of lime. Much interesting data has been obtained, some of it contradictory; but more will have to be done before any definite conclusions can be reached. Slides were used to illustrate these tests.

Gas Concrete A review of the progress being made in this country by Durox gas concrete was presented by Karl Lagnefors of Swedish American Industries, Inc. This product was originated in Sweden, where it is widely used for various types of construction.

It was first introduced in this country in 1957, when a modern plant was built in Denver, Colo. Since then four other plants have been built in this country, and several others have been licensed. There are now 70 such plants in the world, including a few in Poland and Russia. A movie showed the entire process of manufacture. The raw materials are lime, cement, and a finely pulverized material, and aluminum powder is the foaming agent. The finished product is light but strong; it has a high insulating value, high resistance to absorption, and low expansion and contraction. It can be sawed or nailed and can be used for building units, slabs, panels, etc., and can be reinforced.

Efficient Vertical Kilns At the convention held at The Broadmoor, Colorado Springs, Colo., in 1957 much interest was created in a highly efficient vertical lime kiln developed by personnel of a firm now known as the Union Carbide Olefins Division. Fantastic results were achieved in increasing the capacity of three kilns, each of which was originally rated at about 100 tons per day, to about 480 tons daily. The product, while usable for the manufacture of calcium carbide at the company's Ashtabula, Ohio, operations, was not suitable for most commercial uses due to the relatively high percentage of core and some lack of uniformity in the product.

D. E. Stingel, production manager for the company, an N.L.A. convention speaker, described the progress made in the last two years, especially in the improvement in the quality and uniformity of product. The use of larger stone, better control of draft, heat, improved drawing methods, and other changes have been largely responsible for this improvement; and the automation of the operation has greatly increased efficiency. A detailed description of this operation and the results obtained was published in the May, 1959, issue of PIT AND QUARRY.

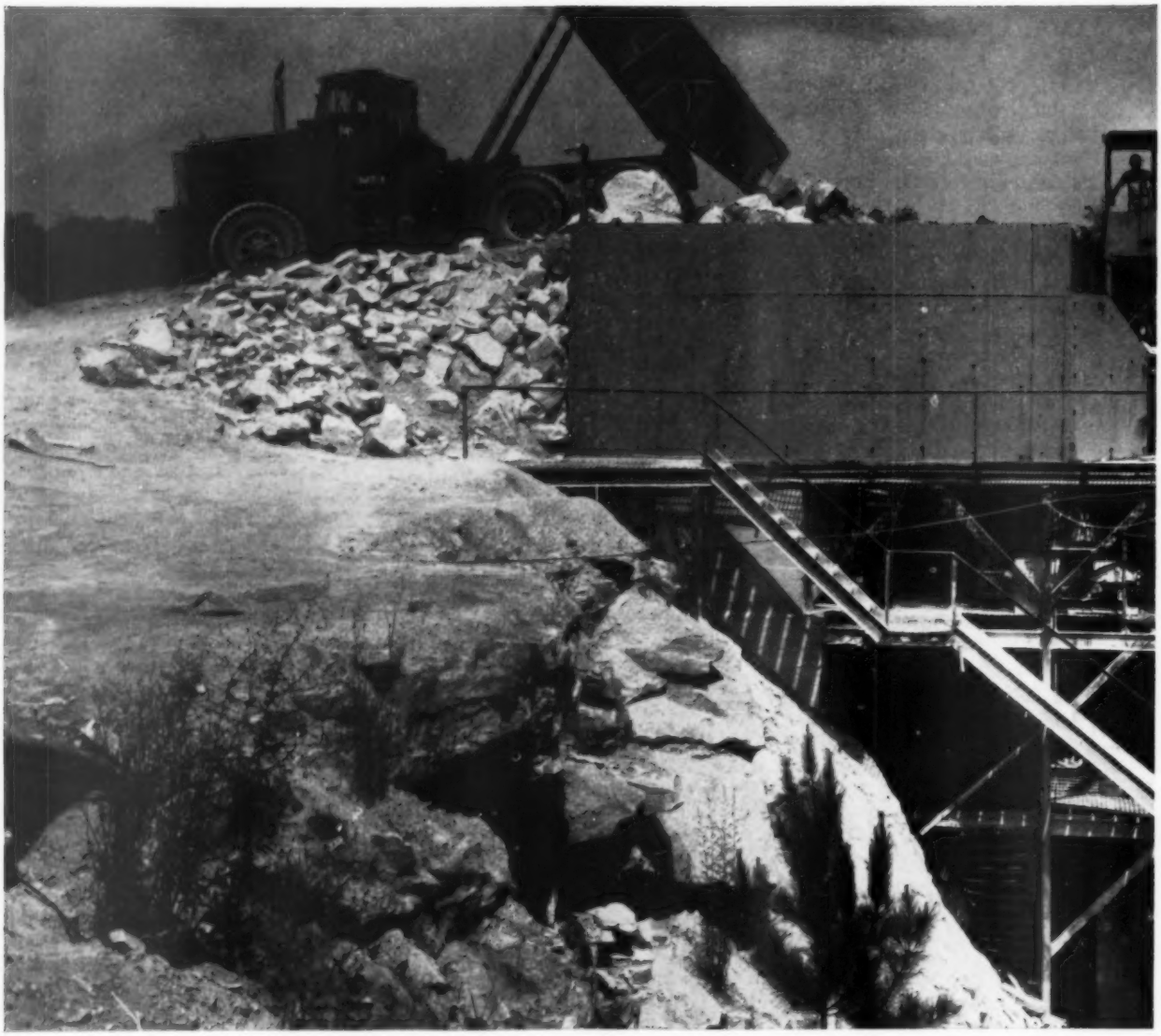
Liming Lakes and Ponds In his paper on *Liming Lakes and Ponds,* Dr. William R. Schmitz of the Hydrobiological Laboratory, University of Wisconsin, Department of Zoology, told of the latest developments with respect to the use of lime to propagate the growth of fish, especially game fish. He reviewed the development of this ancient art in Asia, later in Germany, and in this country since its introduction here in the late '30s. Here, however, there is comparatively little commercial demand for fresh-water fish, the interest being chiefly in fishing for sport. Unfortunately, the various factors involved make the propagation of game fish a much more difficult problem.

According to Dr. Schmitz, lime is most effective in conjunction with organic or inorganic fertilizers in promoting nutrient release, and some phenomenal results have been obtained with its use. In Germany intensive culture has yielded up to 1,500 lb. of carp per acre per year, but in this country there is not enough demand for carp to justify the expense. Farm fish ponds are increasing in number, however. There are now about 8,000 of them in Alabama alone. These ponds yield up to 200 lb. of panfish per acre. Standard procedure is to use about 15 lb. of finely ground limestone for each 100 lb. of inorganic fertilizer.

There has been ample proof of the value of lime and fertilizer in increasing the yield of such fish in ponds which are bodies of water shallow enough so that the water can continually mix from the top to the bottom. Treating lakes is a problem said Dr. Schmitz, because, being deeper, they are divided into two temperature zones or layers which do not readily mix. This makes lakes wasteful of nutrient material and relatively unresponsive to fertilization or alkalization. Progress is being made, however.

Research, Sales Psychology The material interdependence of market research and selling was clearly described by Dr. Bertrand Klass, Forbes Marketing Research, who pointed out that in selling lime or anything else the basic problem is the same, as in all cases the prospect is a human being and a consumer. Many sales procedures are unsuccessful because they are self-directed rather than aimed at the customer. People must

(*Continued on page 128*)



Stockbridge Stone Division, Vulcan Materials Company,

GULF MAKES THINGS

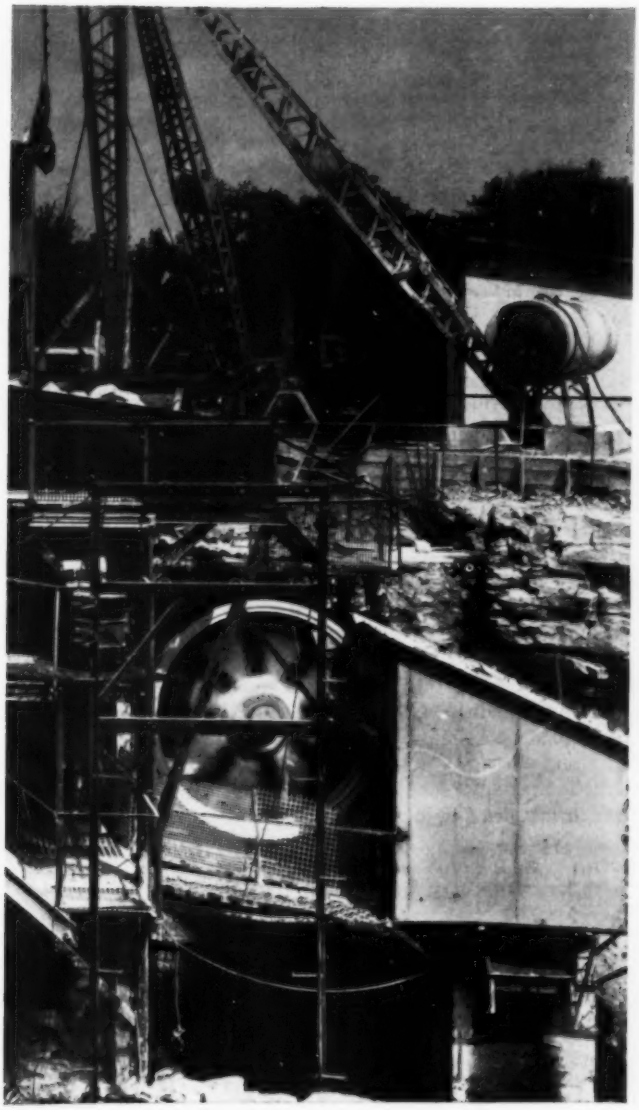
Ask Harold Boring, Plant Superintendent of Stockbridge Stone Division, Atlanta, Georgia, how Gulf makes things run better. He'll show you a streamlined operation that turns out 5,000 tons of crushed granite a day.

Stockbridge Stone uses Gulf fuels and lubricants to provide an extra measure of protection for their huge investment in equipment.

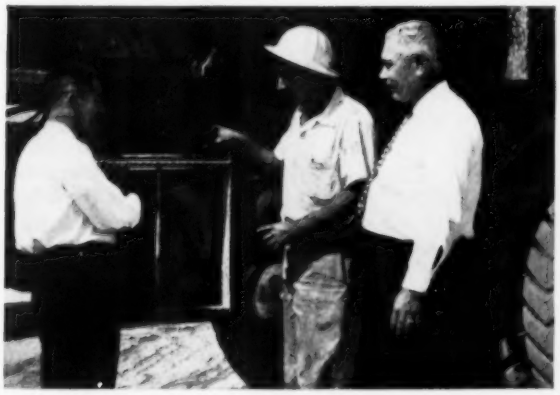
"Our equipment," reports Mr. Boring, "includes a huge jaw crusher, four recrushers, two drills, two draglines, two dozers and five 35-ton Mack diesel trucks. The trucks alone represent over a $300,000 investment.

"To protect our equipment, we use the most effective lubricants we can get and we make sure they're changed at the proper intervals. And that's pretty often with us. Our policy is that grease and oil are cheaper than downtime.

"For instance, to protect the babbitt bearing in the jaw crusher, every day we pump in about 100 pounds of Gulfcrown Grease No. 1 — which serves as both lubricant and flushing agent. The



Granite loads up to 28 tons are hauled by 35-ton Mack diesels at this Stockbridge Stone granite quarry. Gulf Dieselect is the fuel. Gulf Dieselube H.D. is used for crankcase lubrication.



Quarry man checks with Gulf men. Harold Boring, center, Plant Superintendent at Stockbridge granite quarry, discusses maintenance of 35-ton Mack with Gulf Sales Representatives C. E. Reese and J. C. Estes.

King-sized jaw crusher at Stockbridge Stone granite quarry, where Gulfcrown Grease protects babbitt bearings against the abrasive action of granite dust.

crushes 5,000 tons of granite a day, finds that . . .

RUN BETTER!

drives of the smaller crushers are lubricated with Gulf Harmony oil.

"In lubricating the Mack diesels, we don't take any chances either. The crankcase lubricant is Gulf Dieselube H.D., and we change it every 120 hours of operation. We're completely satisfied with Gulf products, service and delivery."

How about *your* operation? See how Gulf makes things run better. Call your nearest Gulf office. Meanwhile, mail coupon for 88-page "Contractors' Guide."

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GULF OIL CORPORATION
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Canadian Cement Shipments

IN spite of the fact that the production of all minerals and of nonmetallic minerals in Canada dropped off slightly in 1958 from the 1957 record highs, the portland cement industry set another all-time record, but by a very small margin. Production was 6,316,569 short tons (2,000 lb.), an increase of 1.1 percent over the 6,248,718-ton record of 1957. Shipments to customers (including a small amount used at plants) totaled 6,157,817 tons, an increase of 1.5 percent over the 6,066,381-ton record of 1957.

Stocks at plants and warehouses at the end of 1958 were 613,434 tons, as compared to 457,904 tons at the end of 1957. The value of shipments—$95,869,547— was up 2.9 percent from the 1957 record of $93,167,477. Exports were 141,249 tons in 1958, a sharp drop from 338,315 tons in 1957, but they were over the 1956 total of 124,560 tons. Imports, apparently, were also down considerably from the 92,380-ton total of 1957.

Present indications are that 1959 will show some further increase in the demand for cement, at least through the first half, due in part to the carryover of construction activity in western Canada, which increased sharply during the last half of 1958. Expenditures for new construction are expected at least to equal 1958.

The capacity of the cement industry was increased considerably in 1958 by the completion of two new plants, but there were no import expansion programs. The new 1,500,000-bbl. plant of Lafarge Cement of North America Ltd., at Lulu Island, B. C., went into operation in March. Also early in the year the Lake Ontario Cement Co., Ltd., started up its 1,650,000-bbl. plant at Picton, Ont.

The cement industry of Canada has become internationalized in re-

This aerial photograph of the new Picton, Ont., dry-process plant of Lake Ontario Portland Cement Company shows the dock loading and unloading facilities and the bulk cement storage and loading installation for lake shipments. At the upper left is the quarry area as it appeared soon after initial operations.

Up Slightly in 1958

further modest gains expected in 1959; capacity remains far ahead of demand

cent years, new plants having been built by Swiss, Belgian, and French interests in the provinces of Quebec, Ontario, Saskatchewan, Alberta, and British Columbia. There are no definite plans for new plants or major expansions in 1959, but considerable work will be done to improve the efficiency of existing plants. The British Portland Cement Co. of London, England, recently announced that it will start work this year on a new $15,000,000 plant near Cobourg, Ont. Imperial Cement Ltd. is reported to be still interested in building a 700-ton per day plant at Big Lake, near Edmonton, Alberta, but no definite action has been taken. No announcement has been made about possible cement production of the Ideal Cement Co. Ltd., Rock Products Div., which in 1958 put into operation a quarry and a crushing plant on Texada Island, B. C.

Cement company heads are only slightly optimistic over business prospects for 1959 and later. According to one executive, the cement industry in eastern Canada must face the fact that in 1958 the capacity of producing plants was 50 percent above the cement consumption in the area. Prices remain low, and labor costs and freight rates have gone up. It is not expected that this picture will change much during 1959. This situation is said to be partially due to the fact that new installations were built to replace obsolete plants, which were then left in commission. The new plants are much more economical to operate, but the fact that the older plants are fully depreciated is said to make it possible for them to compete economically. There were some price increases in western Canada but these were said to be sufficient only to cover increased production costs and transportation costs of raw materials.

In Canada in general, overproduction is a problem. This situation apparently had at least one beneficial result in that it made possible some economies in distribution.

PLANT EXPANSIONS

Canada Cement The Canada Cement Company, Ltd., which had increased its productive capacity by 1,500,000 bbl. in 1957 to a total of over 24,000,000 bbl., made only minor additions in 1958. A third 2,000-hp. clinker mill was installed at the Montreal East plant, and other minor changes were made at this operation and others. At one plant in the Niagara Peninsula the conversion from 25-cycle to 60-cycle power was nearly completed.

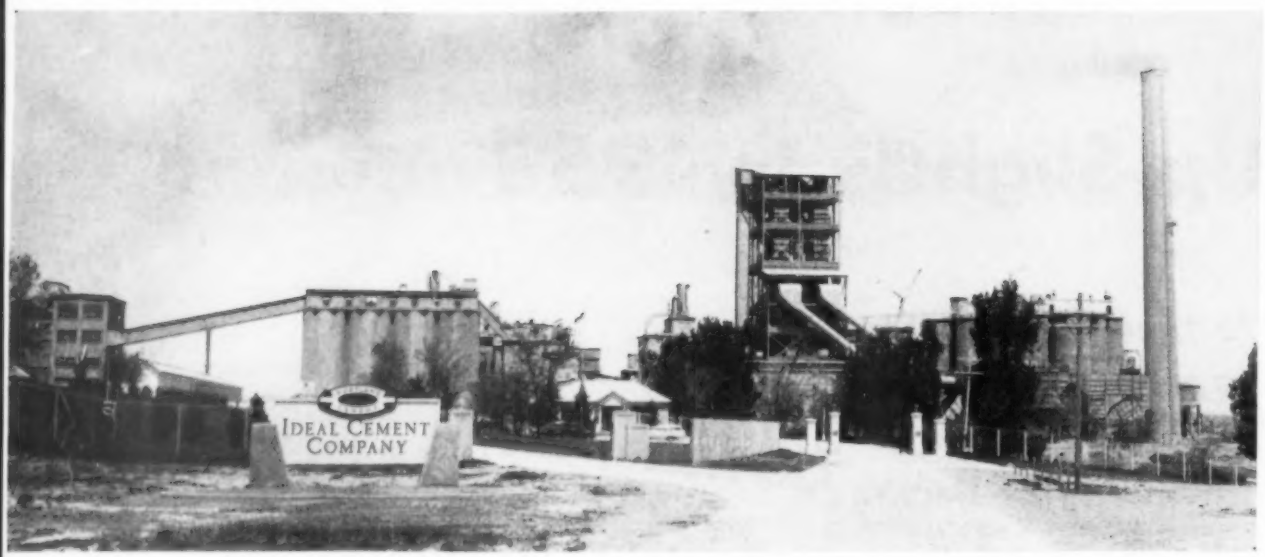
No major expansions or improvements are being made in 1959, which, incidentally, marks the fiftieth anniversary of the formation of the company. Further improvements are being made to the clinker grinding facilities at Montreal East, and at Woodstock, Ontario, and to the distribution facilities at Montreal East and other eastern Canada plants.

Lafarge Lafarge Cement of North America, Ltd., in March, 1958, completed its new 1,500,000-bbl. $16,000,000 plant on Lulu Island, B. C. This plant has a 450-ft. wet-process kiln. Limestone is obtained from a quarry on Texada Island.

Lake Ontario The Lake Ontario Portland Cement Co., Ltd., early in 1958 completed its new 1,650,000-bbl. $16,000,000 dry-process plant near Picton, Ont. Equipment includes two 11- by 375-ft. kilns and four 1,250-hp. raw- and finish-grinding mills—all Kennedy Van Saun—and a Fuller raw blending system. There is a 1,200-ft. long deep-water dock, and shipments are also made by rail and truck. Cement is shipped in bulk from the plant to storage and packing plants at Toronto and Rochester, N. Y. Facilities were later installed for unloading bulk cement from either trucks or cars at the Toronto branch.

St. Lawrence The St. Lawrence Cement Co., which early in 1957 completed a new 3,000,000-bbl. plant at Clarkson, Ont., opened a distribution station at Fort William, Ont., in 1958 to serve the extreme western area of Ontario. In 1959 the Clarkson plant will begin to use limestone brought by boat from its own quarry near Colborne, which is also on Lake Ontario. Boats will be loaded at the 480-ft. long dock 1,300-ft. from shore by means of a conveyor on a causeway.

This company is also involved in the construction of the new 5,000,000-bbl. plant of the Dundee Cement Co. at Dundee, Mich. This operation is expected to be in production before the end of 1959.



IDEAL'S Boettcher Plant

By WALTER E. TRAUFFER

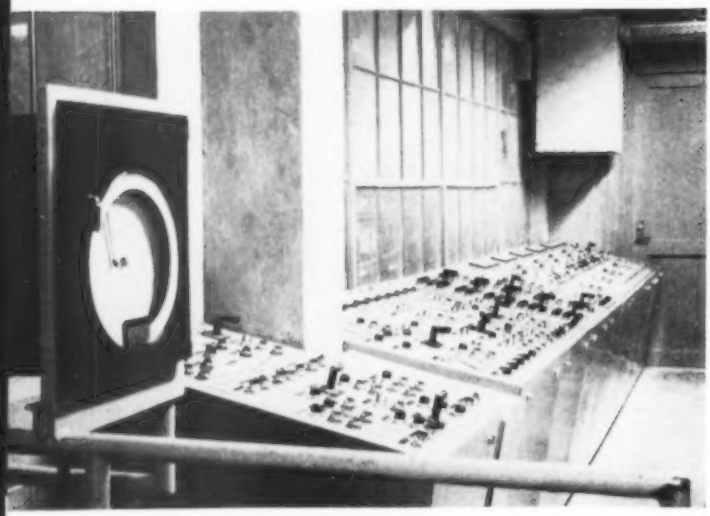
ANOTHER ON THE SPOT REPORT

THE improvement and expansion of the Boettcher, Colo., plant of the Ideal Cement Company is another step in the tremendous program which has been carried on by this progressive concern for the last 12 years. This program has involved the building of five completely new plants, the acquiring and converting of two others to cement plants, and the expansion and improvement of several others.

During this period five plants were also acquired from other companies through mergers or by purchase. Capacity during this period has been increased more than 21,000,000 bbl. to 32,000,000 bbl. for 15 operating units, making Ideal one of the top three producers of portland cement in this country. Further expansion and new plants under way or in the planning stages will increase capacity to about 40,000,000 bbl. by 1965.

The Boettcher plant has been one

The control console for most of the plant with the raw-blending controls in the foreground, the raw mill controls, the cement storage selectors, and the finish-mill controls.



Opposite page: A general view of the Ideal plant at Boettcher, Colo. From left to right are: the secondary crusher building, raw material storage and blending silos, the preheaters, cement storage silos, and the kiln stack.

Another view of the plant area at Boettcher, which is an oasis on the prairie. In the foreground is the plant office, with the safety flag flying.

Features

- *silo raw blending system*
- *preheater kiln system*
- *automatic remote controls*

of the key units in the Ideal system since it was built in 1928. At that time it was the company's pride and a showplace for the entire industry; and it is a tribute to the original design that no major changes have been required in the intervening years. With the completion of the present installation, it has again taken its place as one of the company's top plants and it compares favorably with any other plant in the industry in efficiency and economy of operation.

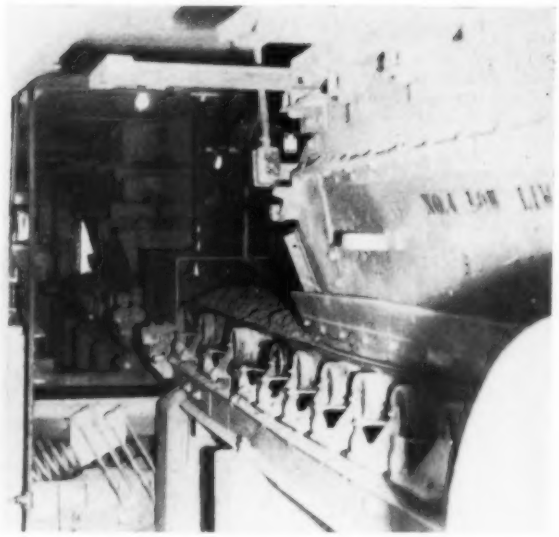
Outstanding features of the plant are now the Fuller-Humboldt preheaters installed on its two kilns. Also of interest are the two new 1500-hp. raw mills and the new Fuller system for storage and blending of feed for the kilns. Another highlight is the use of remote automatic controls throughout, which has made this one of the company's most efficient plants.

When it was built in 1928, the plant had two 11- by 175-ft. rotary kilns and a total capacity of 3,600 bbl. daily. It was a dry-process

The two rotary kilns, with the preheating tower, which has four stages for each kiln. Each of the first stages at the top is double.

plant and generated its own power through the use of waste heat boilers. The plant at present is producing approximately 7,000 bbl. daily. The fuel consumption in the old plant was about 1,300,000 B.t.u.'s per barrel. This figure has been reduced to 800,000 B.t.u.'s per barrel, and further reduction is expected.

Construction was started on the new installations in November, 1955. In March, 1957, the work was essentially completed. During this period there was no interruption of production except in the final six weeks, when all connections were changed over to the new system. What follows is a report on the Boettcher plant after 18 months of operation.

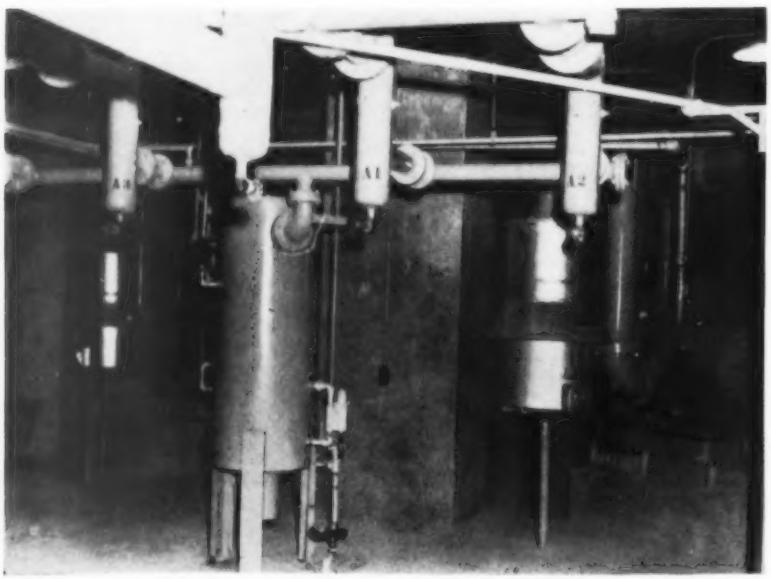


Two of the raw material feeders which discharge on a natural frequency conveyor.

The reason for the expansion of this plant was the rapid and continuing growth of the Denver market, which is its chief outlet as it is Ideal's closest plant (65 miles) to Denver. In the design of the plant the preheaters were the basic factor, and everything else was built around them. These preheaters were selected because they would fit into the existing layout with the minimum of change, because they are in themselves highly efficient and economical to operate, and because they would make use of the existing rotary kilns.

After the preheater was decided on, the dry blending silo system was selected as best suited to the conditions. These silos supplement the original kiln feed silos and provide an ample supply of kiln feed in any weather. This is important because weather sometimes limits the quarry operation. In order to provide sufficient feed for the new kiln systems, two raw grinding mills of the largest capacity then available were selected. To get maximum output from these, a tertiary crusher was installed to provide a minus $\frac{5}{8}$-in. feed. All of the five original mills are now used for finish grinding. Formerly two were used for raw grinding, two for finish grinding, and the fifth could be switched either way as needed. The entire new raw system also makes for easier sampling. This is important as the deposit is in a formation of thin inclined strata of varying analysis, which makes for considerable variation in the material going to the plant.

The compressors, air lines, and valves which provide aeration for the raw-blending silos for blending and discharge.



RAW MATERIALS

Crushing and Drying The rail haulage system formerly used has been replaced, and rock is now hauled from the quarry, a distance of about one mile, to the primary crusher by four 22-ton Euclid end-dump trucks with Cummins diesel engines. Reduction of the rock is by the original 36-by 60-in. Allis-Chalmers Fairmount roll crusher and the Williams No. 9 Jumbo hammermill secondary crusher. These reduce the rock to a minus 2-in. size, which was formerly the feed for the raw mills. As before, this rock goes to eight 1200-ton concrete silos, each 25 ft. in diameter by 63 ft. high. Sandstone goes through the same crushing circuit and to three 300-ton interstice bins. A sampler at the elevator is used for analysis of the material going to each silo or interstice. This department has a capacity of about 350 t.p.h.

Limestone and sand are reclaimed separately from storage onto a 42-in. by 104-ft. Carrier natural-frequency conveyor. This material goes

directly *via* a bucket elevator to the old dryer building, which has two 7-ft. 6-in. by 70-ft. Traylor gas- or oil-fired rotary dryers.

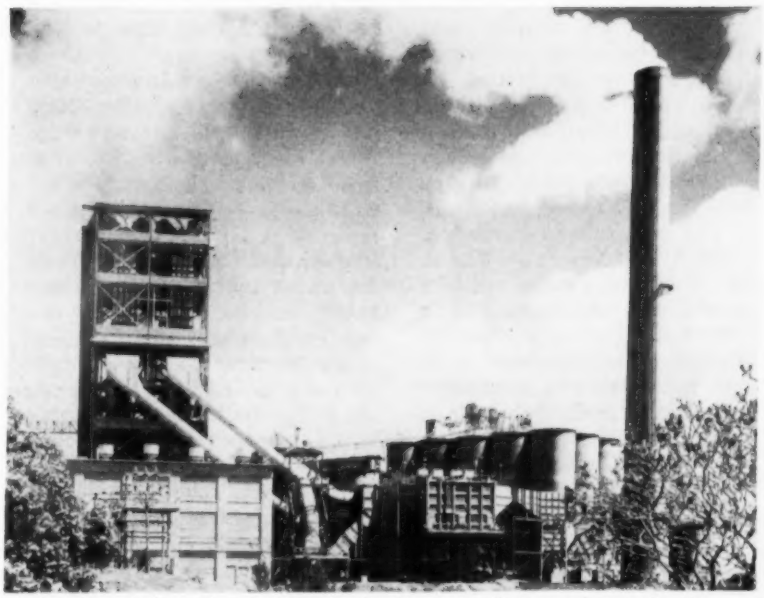
The dryer discharge is transported by bucket elevators to a pair of 5- by 14-ft. Productive Equipment Gyroset vibrating, single-deck screens with 5/8-in. openings. The minus 5/8-in. product passing through the screens is mill feed size. Material over the screens goes to the new tertiary crusher, a Williams Model D, Series 300 reversible hammermill. The capacity of this department is about 210 t.p.h.

There are six 1800-ton concrete silos, each 28.67 ft. in diameter by 55.5 ft. high, arranged in two rows with two interstice bins—one for sandstone and one for iron ore. The conveyor discharges the material being handled through a gate-type splitter to a pair of 24-in. diameter screw conveyors, each discharging into three silos or one of the interstice bins. Discharge from each screw is *via* three 12- by 24-in. Fuller rotary valves which are automatically remote-controlled. These valves are large enough so that no material will pass over them when they are open, and this is further insured by feeding material into two bins simultaneously, one in each row.

Iron ore additive is received in trucks and is carried by a 16-in. screw conveyor, a bucket elevator, and then another 16-in. screw to the second interstice.

The six large raw mill feed silos, three for each mill, are used as follows: two silos contain high lime material and one silo contains low lime for each mill. Withdrawal from these silos is accomplished by the use of 24-in. Merrick Feedoweights, one under each silo. Rock is proportioned to obtain a preliminary mix before going to the mills. Sandstone and iron ore are added as needed by the use of 16-in. Merrick Feedoweights.

Grinding Each mill is closed-circuited with two 16-ft. Sturtevant separators. These separators are fed by two bucket elevators which receive their feed from a 24-in. by 102-ft. belt conveyor under the silos. The raw oversize from each separator returns to the ball mills. This system of grinding increases the mill efficiency by diverting considerable fines (up to 10 percent of the total feed).



Another view of the preheater tower, showing the dust collectors and ducts for them and for their rotary kiln sections. Cement storage silos are in background.

These mills are identical, 11- by 23-ft. Allis-Chalmers two compartment units with bronze bearings instead of the usual babbit. Each has a Farval automatic lubricating system and a high-pressure system which lifts the mill off the trunnions. Steel grinding balls are used, and the load consists of 36 tons of 3- and 4-in. balls in the preliminary compartment and 83 tons of 2-in. balls in the secondary compartment. Each mill is driven at 17.45 r.p.m. by a 1500-hp. General Electric synchronous motor through an Amerigear flexible coupling.

Mill product is returned to the two elevators feeding the separators, forming a closed circuit.

Each separator is vented to a dust collector, and the clean air goes to the atmosphere. Dust from each collector goes to a 9-in. screw conveyor feeding to a bucket elevator, followed by a Fuller-Huron Airslide conveyor.

Each raw mill is air-swept by a 11,000 c.f.m. dust collector which pulls air through the discharge trunnion.

Raw undersize from each separator in each mill circuit discharges to one of two 24-in. screw conveyors. Dust collected from the Amerjet and Norblo dust collectors also goes to these screws. Both of these discharge to a single circuit to the blending silos, consisting of a 24-in. screw conveyor, a bucket elevator, and one more 24-in. screw. This is finished kiln feed ground to 85 percent through 200-mesh.

Blending, Kiln Feed The last-mentioned screw discharges to one of two 24-in. screw conveyors over two of the four blending silos. Each screw has a Fuller rotary valve for its first silo and discharges from the end into the other. The silos are 40 ft. in diameter by 56.4 ft. high, with a capacity of 2,200 tons; each has a dust collector from which dust is returned to the silo. These collectors have individual pressure blowers, but all four are connected to the same exhauster.

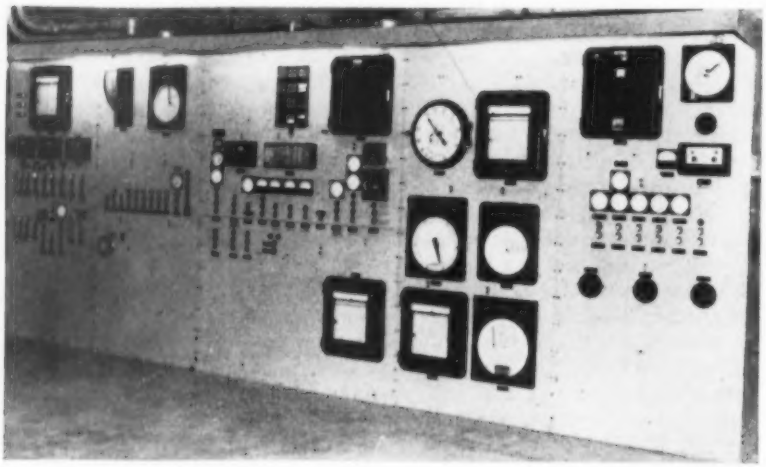
The blending silos are used as follows: one silo is filled throughout a 10-hour period. Every hour a sample of the silo feed is analyzed for $CaCo_3$ and the raw mill Feedoweights are adjusted to give the desired hold point. At the end of the 10-hour period the silo contains a 1,500-ton charge, which is blended for a period of from 2 to 4 hours and analyzed to make sure the hold point has been obtained. It is then released for kiln feed. During the 10-hour period one of the other three silos is being emptied, and the other two are used for released kiln feed storage.

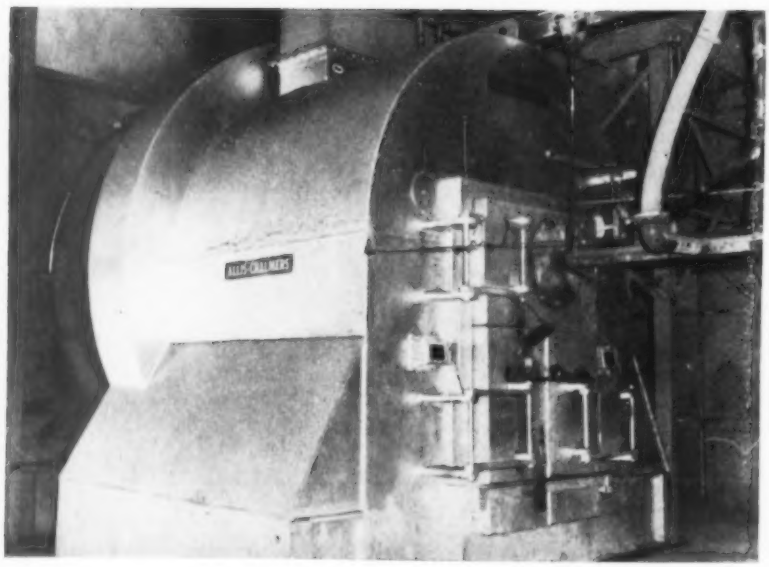
These blending silos are equipped with Fuller ceramic aeration pads. A Fuller C100 rotary compressor for each silo provides holding air which keeps the material in suspension for discharge. For blending the material in each tank, these compressors are supplemented by two Fuller C250 compressors, as only two silos can be blended at one time. Two 10-in. Fuller-Kinyon Type H pumps receive material from the silos, and each of these has a C300 Fuller compressor. Either pump or both of them can be fed from any one silo, as desired. The material is pumped through an alleviator and a dust collection system to four 1,200-ton kiln feed tanks for the two kilns. These tanks are fed *via* Airslides from the alleviator.

Each of the four kiln feed silos discharges through a Fuller rotary feeder into an 18-in. screw conveyor, which feeds one of the two kiln feed bucket elevators. The latter discharges into an Airslide which feeds the two Fuller constant-head feeders, one for each kiln. These feeders are kept at a constant level by the use of a feed overflow system which returns all excess feed to the elevator, which is equipped with a level indicator to stop the silo rotary feeders when a certain level is exceeded and to start them again when there is a shortage. There is a dust collector in this system which returns all of its dust to the elevator.

Each constant-head feeder discharges to an 8-in. Fuller-Kinyon pump which transports the feed to the preheater feed point. There are three F-K pumps—one is a standby—each furnished with a C-175 Fuller rotary compressor.

Below: The control board for one of the rotary kilns and its preheater includes indicating and recording pyrometers, draft gauges, an oxygen analyzer, ammeters, etc.





The new hood for one of the two rotary kiln sections. At the right is the cyclone through which hot air is drawn off for cool drying.

BURNING AND COOLING

Preheaters The two Fuller-Humboldt preheaters are standard design but are the largest ever put in operation in this country. The building in which they are housed is 190 ft. high. They are designed to handle all of the hot gases from the kilns, but are provided with a by-pass for emergency use. They are four-stage units with provisions for feeding into the duct work between stages No. 1 and 2, No. 2 and 3, No. 3 and 4, or below No. 4. This arrangement provides flexibility to meet any future changes in conditions. Feed can also by-pass the preheaters direct to the kilns, if desired. Each preheater has two No. 1 stages or cyclones, each 10 ft. 9 in. outside diameter. The other three stages are single, No. 2 being 14 ft. 6 in., No. 3 being 16 ft. 9 in., and No. 4 17 ft. 10 in. outside diameter. Ducts are all 6 ft. 10 in. in diameter except in stage 4, where they are 7 ft. 4½ in.

Each preheater is now being fed between stages No. 1 and 2. The flow is standard. Hot gases from the top of stage 2 carry the material up to stage 1. A small percentage of very fine material escapes out the top of stage 1 and is collected either by a series of eight small cyclones, or, if the dust lost from these cyclones, a Buell electrostatic precipitator. The major portion of the feed is discharged from stage 1 to the uptake of stage 2, then into stage 2 to gain more heat. From stage 2, the material goes to the uptake to stage 3, into stage 3, to the uptake to stage 4, into stage 4, and then into the kiln feed pipe.

Rotary Kilns The feed pipe in each kiln is 14 in. in diameter and is made of spun cast stainless steel. These feed direct into the two 11- by 175-ft. Traylor rotary kiln sections which are the orig-

inal kilns with new hoods and new drives. They slope ½ in. to the foot and are driven at 70 r.p.h. by 100 hp. motors through Falk gear reducers. Each has an auxiliary drive which gets current from a Caterpillar diesel engine generator set. The kiln firing zones are lined with 70 percent alumina liners.

Cooling The clinker is discharged to two new 4-ft. 6-in. by 90-ft. Allis-Chalmers reciprocating grate air-quenching clinker coolers. Each has a pulsating damper at the throat, a 125,000 c.f.m. fan to provide the cooling air, a 150,000 c.f.m. exhaust fan, and a Buell cyclone-type dust collector. Each cooler is equipped with a clinker breaker at its discharge end.

Gases At the base of each preheater tower is a 100,000 c.f.m. American Blower fan, each of which draws the dust and gases from the top of stage 1 into 10-ft. 3-in. square spray cooling towers. A third tower is provided for by-pass gas. Each of these spray towers, are intended primarily to cool the gases, is equipped with a 350-lb. pressure water pump and a booster. The gas from the spray tower goes to eight Buell cyclone collectors. The fans draw from these collectors to the Buell electrostatic precipitator, which has four compartments. Either half can be closed off when only one kiln is operated during inspection or repair. A 275,000 c.f.m. fan exhausts the gases through the 250-ft. kiln stack, which is constructed of reinforced concrete and has a 14-ft. inside diameter separate brick lining.

Dust The dust from the cyclone collectors is returned by screw conveyors to the kiln feed pipe. Dust from the electrostatic precipitators is conveyed and elevated to a 15-ton surge bin, from which it is also fed into the kiln feed pipe.

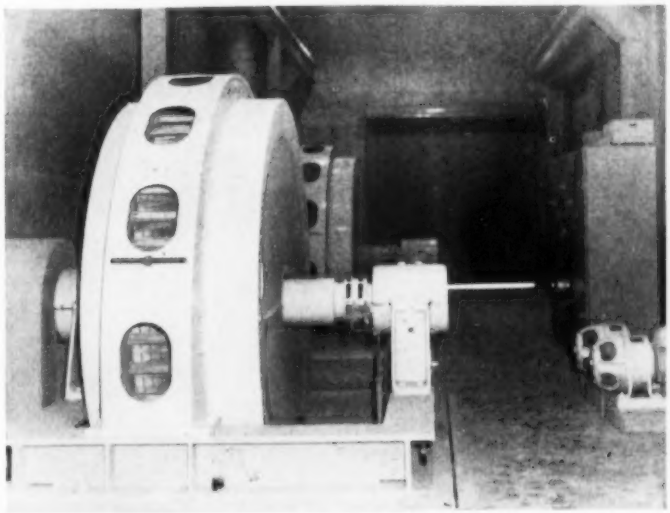
Firing Both kilns are normally fired with natural gas. However, coal is used as a stand-by fuel. Raymond No. 533 A bowl mills were installed in 1951, with ample reserve capacity. Hot air drawn from the kiln hood through a cyclone enters the bowl mill at about 600 deg. F.

CONTROL SYSTEM

The system of remote automatic controls used in this plant has greatly improved its efficiency and economy of operation. The entire raw grinding, blending, and clinker grinding departments are controlled from a console-type board. Each unit is operated by an individual switch which has red and green indicator lights.

Each of the two kiln control boards on the kiln floor has every instrument necessary for the preheater, rotary kiln, cooler, coal mill, and all related equipment. Included are the usual recording pyrometers, draft gauges, ammeters, damper positioning indicators, visual and audio alarms, oxygen and combustible analyzers, etc.

The gas temperature in the rotary kiln burning zone is 2700 deg. F.; at the preheater inlet it is about 1550 deg. F.; and in the first stage of the preheater, at the top of the tower, it is about 800 deg. F. The raw material leaves the preheater at a temperature of about 1450 deg. F.



The 1500-hp. synchronous motors which drive the two 11- by 23-ft. raw mills.

One of the two bulk truck-loading stations. Air conveyors (above) feed to air conveyors for loading (right) or to the packhouse (background).

Koehring Dumptor has no body-hoist — operator trips body-release lever, and *gravity* dumps the load in *one second*. You get this same fast dumping every time, under heaviest loads, in all temperature extremes, because *gravity*-dump never balks, never wears out. No hoist parts to buy, no costly down-time.

HERE'S

A TON OF STRENGTH

FOR EVERY TON OF PAYLOAD CAPACITY

When it comes to dependable performance under rugged off-road hauling conditions, Koehring® heavy-duty Dumptor® is in a class by itself. All welded 6-yard body, built for rock, has rib-reinforced sides and ends. Top edge is of box beam construction. Bottom is lined with multiple steel beams that cushion the impact of heavy loading. Bolted or free-swinging kick-out pan adds another ½-inch steel plate to Dumptor bottom.

There's plenty of strength, too, in the heavily-trussed chassis to take constant pounding of rough off-road hauling. Steering axle oscillates 21 inches, keeps twists and strains away from main frame. There are no leaf springs — just one big snubber-type chassis spring on steering axle — none on the drive axle. Big, shock-absorbing drive tires eliminate the need for more springs — save on spring maintenance. It's heavy-duty construction like this — in the body, in the heavily-trussed chassis on which it rides — that adds up to "a ton of Dumptor strength for every ton of payload capacity."

Even with all this heavy-duty strength, Dumptor still has more than 6 H.P. for every ton of loaded weight. It accelerates fast, climbs 24% grades fully loaded. If you have a tough hauling problem, see your Koehring distributor about this heavy-duty 6-yard Dumptor. Why not call him right now?

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

KOEHRING® DUMPTOR®

KOEHRING HEAVY DUTY

K814

FULL REVOLVING

SKOOPER

FREE SWINGING

SKOOPER
easily loads over side or end of truck. 3 types of interchangeable buckets (rock, rehandling, and general-purpose) assure big payload performance in all materials, on all types of jobs.

It's the new equipment sensation of the year!

Now you can do big-bucket digging and loading *without* the usual drive-in back-out waste motion — and *without* the high maintenance of skid-turn operation. Revolutionary new Koehring® SKOOPER gives you a *full-revolving* loader for fast "stand-still" digging and loading. Here's the way it works: Powerful action of the twin hydraulic rams crowds the 2-yard bucket along a smooth 7-foot level cleanup without traveling from "stand-still" position — or cuts at any angle of bank slope. SKOOPER then makes a full-revolving swing, dumps load fast and clean from roll-over bucket. Then, it swings back, starts next cycle — *all without traveling.*

"Stand-still" cycle lets you work in tight quarters inaccessible to ordinary drive-in back-out-and-turn loaders. Or, at any time, SKOOPER can swing and travel simultaneously. Works with crawlers parallel to cut, or headed into bank.

See this revolutionary SKOOPER in action. Stop-watch its fast cycle time — see for yourself how many tons it moves per hour with *only 70 horsepower!* Check its economy of motion, low maintenance cost, and unique advantage of excavator-crane convertibility. Call Koehring distributor now, or write.

K901

Mail to: KOEHRING Division, 3026 W. Concordia, Milwaukee 16, Wisconsin

Send us: ☐ bulletin ☐ specification sheet on revolutionary new SKOOPER

NAME ..... TITLE .....

COMPANY ..... DEPARTMENT .....

STREET ..... CITY, STATE .....

K901 PQ

KOEHRING DIVISION OF KOEHRING COMPANY • Milwaukee 16, Wis.

There is a separate control board and an indicating and control board for the cement silos and packhouse, which is located in the packhouse foreman's office.

FINISH GRINDING, STORAGE AND PACKING

Clinker from each of the two coolers is discharged onto 18-in. Carrier natural-frequency conveyors, so arranged as to serve either cooler or both coolers. A series of conveyors and bucket elevators can carry the clinker either to three new 9,000 bbl. concrete silos or direct to the finish mill system.

Gypsum is discharged from trucks into a hopper from which a pan feeder supplies a 24-in. by 40-in. Pennsylvania roll crusher. A series of belts and elevators feeds the gypsum to a fourth silo.

Grinding The clinker and gypsum are fed from these silos by a series of conveyors and elevators to the five two-compartment finish mill feed bins. One of the clinker silos has a Merrick Feedoweight for use when special cements are being made. There are two Waytrol feeders under each mill feed bin, a No. 118 for gypsum and a No. 330 for clinker. These discharge *via* 12-in. screw feeders into the five 8-ft. by 26-ft. two-compartment ball mills.

The product of each mill is carried by a 12-in. Airslide to an elevator and by another 12-in. Airslide to a 14-ft. Sturtevant separator. Rejects from the separator are fed by 18-in. screws back to the mill screw feeder. Dust from the separator goes to a bag-type collector and is returned *via* Airslides to the elevator ahead of the separator. Airslides feed the cement from all five separators to a surge hopper over two Fuller-Kinyon pumps, one an 8-in. and the other a 9-in. unit. Either pump can discharge through either of two lines to the existing silos or to the new storage silos. Cement is distributed into the silos by means of Airslides.

Storage and Packing The 12 existing silos, arranged in two rows, are 30 ft. in diameter by 80 ft. high and have a total capacity of 170,000 bbl., with their interstices. The 15 new silos are arranged in three rows and are 26 ft. in diameter by 93 ft. high. With their interstices, the total capacity is 160,000 bbl. The combined capacities of both the existing and the new silos gives Ideal's Boettcher plant a grand total of 330,000 bbl. of available storage. Withdrawal from all silos is by means of rotary feeders and screw conveyors, which feed to bucket elevators and Airslides. There are two bulk truck-loading stations, fed by Airslides. Trucks are loaded while they are standing on automatic scales. In the packhouse there are four St. Regis four-tube packers.

OTHER INFORMATION

The basic design of the improvements made at the Boettcher plant were by the company's own engineering staff, headed by George Wiley, chief engineer. Stearns-Roger Manufacturing Company did the detailed engineering and construction of the plant modification and improvement. The new cement silos were designed by Ken White, consulting engineer, Denver; and they were built by D. J. Rheiner and E. H. Conrad, Joint Venture of San Antonio, Tex. Robert Biggs was construction superintendent for Ideal.

The operation of this plant is under the general supervision of Thomas B. Douglas, vice-president, operations; Stephen A. Gretencort, general production manager; Horace Straight, regional production manager; Don Carlson, plant manager; and Ralph May, assistant plant manager.

N.L.A. Convention

(From p. 115)

be dealt with on the basis of what they know and think, or they will be antagonized. The effective selling of anything to anyone must take into account the needs, wants, attitudes, and desires of potential customers.

According to Dr. Klass, effective selling must achieve three things:

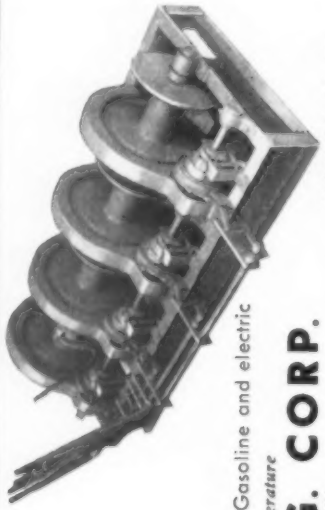
1. It must reach the right people. A large percentage of calls are made on the wrong person. Even after the right person is reached, one must know how to attract his interest.

2. People we want to sell must be motivated. Price, availability, service, etc., are important but not enough. The mental image a buyer has of a company is often the deciding factor.

3. Action must be initiated. Advertising can reach and motivate people, but it alone usually cannot close a sale. The salesman must do this at the right place and time.

Exploration drilling will be the topic of a three-day symposium to be held at Pennsylvania State University on October 8 to 10. Jointly sponsored by the departments of mining engineering at the University of Minnesota, Colorado School of Mines, and The Pennsylavnia State University, this will be the ninth annual drilling symposium held since its inception in 1950.

The Flintkote Company of East Rutherford, N. J., has entered into an agreement for the purchase of the assets of Glens Falls Portland Cement Company, Glens Falls, N. Y. The latter firm operates one plant, which produces cement and portland cement.



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Enter 128 on card, page 155

NEW S-12

joins Euclid Rear-Dump Line!

The Model S-12 Euclid-Easton hauler—with payload capacity of 44,000 lbs.—is a new size Euclid over-hung engine type semi-trailer rear-dump. Designed and built as a complete, balanced unit, it combines the experience of two leading manufacturers of hauling equipment for mines, quarries and heavy industrial and construction work.

With 218 h.p. and 5-speed gear transmission the S-12 has a fast travel speed and ample power for the toughest jobs. Big 24.00 x 25 tires on all wheels provide traction and flotation for operation under conditions that would stop other haulers. For work in close quarters the 90° hydraulic steering and variable wheel base gives the unit exceptional maneuverability and helps cut cycle time.

Well reinforced body is constructed of special alloy steel to withstand the impacts of shovel-loaded rock and heavy excavation. Single stage double-acting hoists raise the body quickly, with smooth positive control all during the dumping cycle.

Have your Euclid dealer show you how this Model S-12, or the 12 and 35 ton semi-trailer models with 143 and 325 h.p., can cut hauling costs. He'll be glad to tell you about other Rear-Dump "Eucs" of 10 to 50 ton capacity, too.

EUCLID Division of General Motors Corp., Cleveland 17, Ohio

22-ton capacity
14 yds. struck
218 h.p.
24.00 x 25 tires
22.6 mph top speed

Euclid semi-trailer rear-dumps are available in 3 capacities—12, 22 and 35 tons with 143, 218 and 325 h.p. Tractors for these models are interchangeable on 7, 12 and 21 yd. scrapers.

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

WONDERWALL™ cuts bag costs up to 20% for Huber Corporation

"In just one of our critical shipping areas, we saved 20% in bag costs by switching to WONDERWALL", states Mr. E. M. Krech, Director of Purchases for J. M. Huber Corporation, Hillside, N. J., the largest producer of Kaolin clay in the United States.

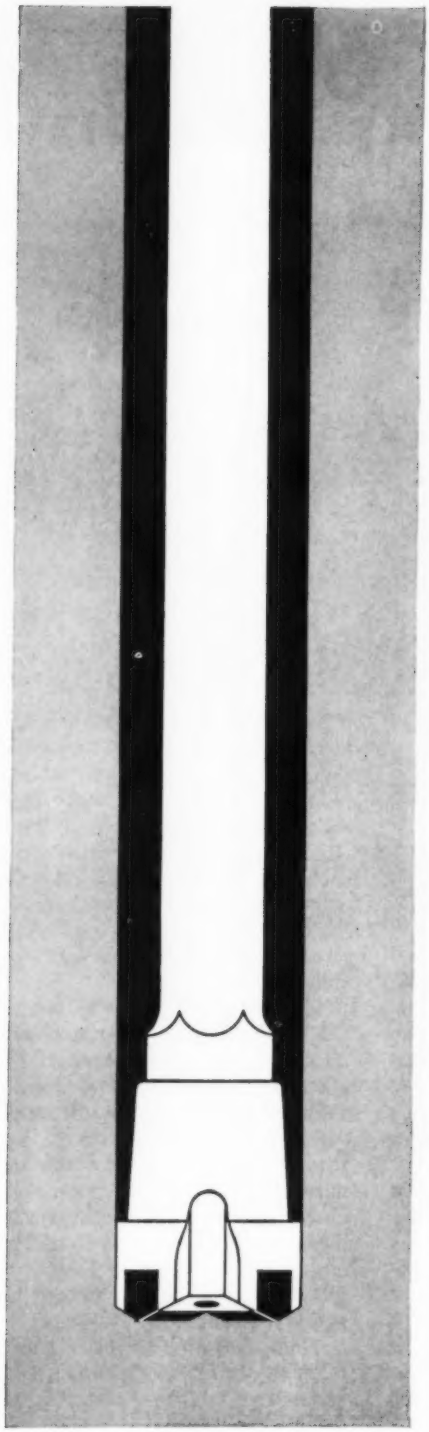
"WONDERWALL bags have demonstrated their strength in resisting breakage under severest transit conditions. We reduce breakage and actually save money by using a WONDERWALL that is 40 pounds lighter in basis weight than our former natural kraft multiwall."

WONDERWALL is West Virginia's new, tougher multiwall that outperforms ordinary bags because it's made with Kraftsman Clupak* paper. It *stretches* and withstands punishment that breaks old-fashioned kraft. WONDERWALLS pack faster, handle easier, stack better —weigh and cost less.

See how the WONDERWALL can cut your bag costs too. Let a West Virginia representative show you. Write or call Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y.

West Virginia Pulp and Paper

*Clupak, Inc.'s trademark for extensible paper manufactured under its authority.



There's More Footage and Greater Economy in a Joy TC Bit

Here's why . . . Joy bit blanks are precision machined from a fine alloy steel, and a controlled heat treating process adds strength to give rugged service and long life. The carbide insert, a special grade selected for its extra footage-producing ability, is brazed to the bit blank by an exclusive process. This provides a super tough bond between the carbide and the bit blank—there's no lost time due to lost carbides.

These features, plus the excellent chipway design that provides maximum hole cleaning ability, keep Joy bits drilling longer. You get more hole per bit . . . more hole per shift . . . more production.

For proof of performance, contact your Joy representative. He will be glad to demonstrate Joy Tungsten Carbide Bits.

Write for Bulletin 295-26

YOU'LL FIND YOUR BIT SIZE IN THIS CHART

SHOULDER DRIVE	BOTTOM DRIVE	TAPER SOCKET
1½"	*2½"	1¼"
1⅝"	*2¾"	1⅜"
1¾"	*3"	1½"
1⅞"	*3¼"	1⅝"
2"	*3½"	1¾"
2⅛"	*4"	
2¼"	*4½"	
2⅜"	*5"	
2½"	†4"	
2¾"	†4½"	
3"	†5½"	
*3½"	†6"	
*4"		
*4½"		

NOTE: * x-type.
†Rose design
Others are cross type.

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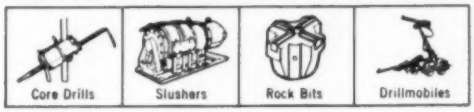

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In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

WSW M-7510-295

GasprO Ltd., Expansion—

By ALLEN H. RENTON
Executive Vice-President, Sales Manager
GasprO, Ltd.

This 50 t.p.d. lime plant of GasprO, Ltd., about 32 miles from Honolulu, provides a large percentage of all the lime used in the 50th state. The facilities originally started as a lime plant in 1927, were used to manufacture cement during World War I. This modern and enlarged plant has been in operation only a year. The dust-free scrubber can be seen in far left corner.

ANOTHER P&D EXCLUSIVE

EVEN lime is exotic in the 50th state of our Union — Hawaii. Here lime is used extensively in the sugar and pineapple industries — the two largest export commodities from these semi-tropical islands.

Last year, GasprO, Ltd., relocated and enlarged its burning and hydrate operations. A 35-t.p.d. plant built in the 1930's in the central industrial area of Honolulu was moved to GasprO's quarry site at Waianae, about 32 miles from the city.

Designed by Wolf G. Bauer, consulting engineer, Seattle, Wash., this modern plant is practically a dust-free operation. Through more efficient use of equipment, production was raised to 50 t.p.d. The new lime plant is now operated just a few miles from the famed Makaha Beach, where the exciting championship surfing contests are held.

The Waianae area also has some of the finest and largest limestone deposits in the Islands. Lime manufacture was started at the present site in 1927, when the Waianae Lime Company put in the first commercial plant in Hawaii.

GasprO did not get into the lime business intentionally. In the late 1920's the firm added CO_2 to its line of compressed gases; and as demand increased, it was necessary to enlarge production facilities. Initially, CO_2 was obtained through the process of pineapple juice fermentation. However, this method proved unsatisfactory since products in which the dry ice was used always tasted like pineapples. This might be pleasant to those on the mainland, but in Hawaii a change in flavor once in a while is desirable. And, as pineapple harvesting is a seasonal operation, there was no steady source of supply.

It was therefore necessary to establish a new plant for the manufacture of CO_2 and it was decided to use imported coke as fuel. At that time most of the coke came from Europe, especially Germany. When Hitler started his war preparations, it became difficult to get coke. GasprO management therefore turned to the burning of limestone, which gives off CO_2, to extend the available supply of fuel.

In burning limestone to recover CO_2, an excellent grade of lime is also produced as a by-product. The Hawaiian sugar industry, which turns out about one-fourth of all sugar grown under the U. S. flag, requires lime in the juice clarification process. Therefore, a modern lime plant was built, and crushed limestone was brought in from Waianae. In 1939 GasprO bought out the Waianae Lime Company and closed the operation.

Then came the attack on Pearl Harbor, and great demand for all types of products — including cement. As trachyte is available in substantial quantities close to the quarry in Waianae, all the raw materials necessary were available, except for a small percentage of gypsum.

By September, 1944, a crude cement plant was set up at Waianae, made principally out of the old lime plant equipment and facilities. Ha-

Our 50th State's New Lime Plant

Raymond Hanabusa is the lime and quarry superintendent for GasprO.

waii for the first time was making her own cement. As no new equipment could be purchased, it was a rough "make-do" setup, but it produced badly needed cement. However, with the end of the war in August, 1945, the cement plant was closed, since it could not operate competitively with modern mainland plants.

When expansion of lime facilities became necessary two years ago, consideration was already being given to relocating some of the operation to get away from crowded conditions in the old industrial site. The Waianae site appeared to be an ideal location.

The quarry has a 40-ft. working face exposing a combination of sandstone, limestone, and puka puka (coral) rock. Ammonium nitrate is used as the major blasting agent, and loading is handled by a Bucyrus-Erie 37-B shovel. A pair of 8-cu. yd. dump trucks haul to the crushing plant.

The latter, a 24- by 36-in. Farrell-Bacon jaw crusher, handles primary reduction. A 3-ft. Symons crusher is used for secondary work, followed by a 6-in. McCully reduction unit. The product of the Symons crusher goes to a scalper, from which plus 1½-in. material is fed to the McCully tertiary crusher. Two TY crushers and a Jeffrey hammer mill are used to handle specialty materials.

The 1½-in. by ¾-in. fraction is stored in a bin for kiln feed. Material below ¾-in. is sent to the TY crushers which make material for roofing aggregate and for hollow tile manufacture.

The lime plant has a Syntron feeder with grizzly bars to screen off ¼-in. minus material. A Rockerarm feeder measures kiln material, and a bucket elevator raises it to discharge into a stainless steel kiln feed pipe.

The kiln is a 6- by 90-ft. Allis-Chalmers unit, driven at 55 r.p.h. by a 25-hp. reduction motor. Calcining zone temperature is 2200 deg. F. Refractory lining in the high-temperature areas is of 70 percent alumina brick. A 3- by 75-ft. steel duct carries exhaust gas in the fan-induced draft to a wet scrubber.

The latter has twenty ¾-in. sprays, and uses about 300 g.p.m. of water. Recirculation of the water is accomplished with a 20-hp. 4 x 2 Allis-Chalmers pump. Two 75- by

(Continued on page 136)

The new lime warehouse of GasprO's Waianae lime plant is shown in the foreground. Hydration equipment is located in the tall structure. Behind the kiln are the dump station and crushing facilities.

▲ Accent on rubber is evident from Holloway's line-up of equipment. Note the two Michigan Tractor Shovels, the two Michigan Scrapers, and the Michigan Dozer—all on rubber.

Matched earthmoving team—Michigan Model 280 Dozer push-loading Michigan Model 210 Scraper—picks up 18 tons of sand-silt-clay overburden in 40 to 75 seconds. Later, same machines will load gypsum. ▼ Average payload in this material: 16½ tons.

Gypsum producer halves machine needs, cuts operating costs, yet raises output. The "key":

His Matched Michigan Tractor

Operating efficiency has hit an all-time high—and costs an all-time low—for H. M. Holloway Inc., California's largest producer of gypsum.

Main reason is a switch in their work fleet from crawler to rubber.

Two 19-yd Model 210 Michigan Scrapers now handle both overburden removal and gypsum mining. These units are the only Scrapers on rubber which have proved capable of climbing up soft sand-silt stockpiles.

A Model 280 Michigan Dozer handles scraper push-loading. Its 262 hp on rubber has cut average load time from 2½ minutes to under 1 minute.

Two Model 175A Michigan Tractor Shovels load the finished gypsum . . . 22 ton trucks in less than 4 minutes each.

With scrapers, dozers, and loaders all one make—all with similar power trains, controls, engines, tires, etc.—Holloway gets the benefits of lower parts stocks . . . easier operator training...easier servicing.

Michigans have brought about *much lower operating costs, too.* Holloway's records show total hourly costs for each machine (wages, fuel, maintenance, parts, depreciation, insurance and taxes) to be equivalent to what they were previously spending on *crawler track maintenance alone*, according to H. S. Holloway, company president.

"We now mine, mill, and load over 3,000 tons of gypsum a day," says Claude Knox, company v.p.

"The Michigan Dozer and Scrapers, three units, do *twice the work* of the *six* crawler-mounted rigs they replaced," adds Mr. Holloway.

"What's more," he says, "we used to remove no more than 3 ft of overburden to get at 3 ft of gypsum. Now, the ratio has been cut to 3 ft of overburden to 2 ft of gypsum . . . so layers once wasted are now profitably mined."

Overburden removal: 2,500 tons every 9 hours

In typical operation, the Michigan

▲
Scraper unloads silty overburden on 35 to 40-foot-high stockpiles over wasteland. Once considered a crawler job (other rubber-tired scrapers tried and failed), the Michigan handles hill-climbing on free-running silt with comparative ease.
▼

◀ Michigan Tractor Shovel attacks gypsum stockpile, loads 2¾ to 3 cu yds per "bite." Typical 22 ton truck takes 6 passes, 3½ minutes.

Dozer-Tractor Scraper fleet

Dozer-Scraper three-unit team strips 2,500 tons of overburden every 9-hour shift. By building dump piles 35 to 40 ft high in adjacent-mined-out areas, double-handling is eliminated, also haul distances are kept under 1,000 ft. This, incidentally, is the job no other rubber-tired Scraper could do; success of the Michigans in climbing the free-running silt is attributed by Mr. Holloway to their excellent balance, power-shift-torque converter drive, and high ratio of horsepower to loaded weight.

Same units mine gypsum

When all overburden has been removed from a work area (usually 400 x 800 ft), the Michigan Dozer-Scraper team keeps right on working, removes the layer of gypsum. This material is dumped in windrows, roughly 11 ft wide, 2 ft deep, 600 ft long.

Tractor Shovels load 2,200 tons daily

Next step is processing—300 tons per hour—and the final step, once the ready-to-use, one-inch-minus material is spewed by a conveyor into large stockpiles, is loading. This last job is handled by two 2¼ yd Michigan Model 175A Tractor Shovels. Their output averages 2,200 tons per unit per day.

Demonstrate? Glad to!

If *you* are one of the *11,000 owners* of Michigan Tractor Shovels, we urge you to look into the added efficiencies of having the same power train in *your* Dozers or Scrapers. Pick the Michigan model and size you'd like to see . . . then call to arrange a demonstration. Michigan Tractor Shovels are now available in bucket capacities of 16 cubic *feet* to 6 cubic *yards* . . . Dozers: 165, 262, 375, and 600 hp . . . Scrapers: 10½, 19 and 29 yards.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK® EQUIPMENT

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Benton Harbor 26, Michigan

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Enter 134 on card, page 155

5 FULL YEARS
ON STONE DRIER
—HIGH-EFFICIENCY COLLECTION
—NO MAINTENANCE COST!

This Dustex Miniature Cyclone Collector has been on the job at Rock Road Construction Co. in Chicago for five years, and a second Dustex, for four years.

"We have yet to spend any money for maintenance and repair," the firm reports. "You claimed high-efficiency collection and low maintenance costs. Your claims have been fully substantiated."

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PERFORMANCE-PROVED
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BULK MATERIAL TONNAGES CLIMB!

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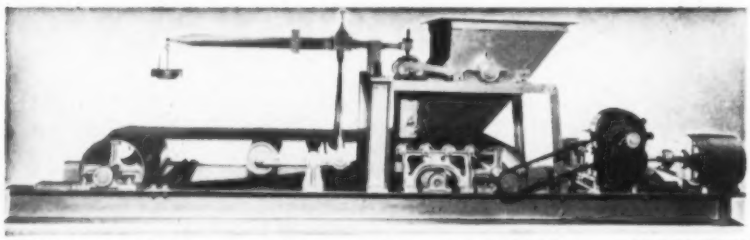

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YOU'RE LOOKING AT the machine which has won acceptance everywhere for peak efficiency in handling scaling jobs.

It's the ultimate in speed, accuracy and automatic operation —a smooth-working unit that assures uniform products on a high-economy basis.

Finely designed and sturdily built, the Poidometer provides continuous service where the going is roughest.

It's available with remote control devices for showing and changing feed rate, and with total weight recorders.

SCHAFFER POIDOMETER CO., 2828 Smallman St., Pittsburgh 22, Pa.

Enter 136-B on card, page 155

GasprO Inc. Expansion

(*From page* 133)

150-ft. reservoirs, averaging about 6 ft. in depth, are used to recirculate water from the scrubber.

A 4- by 30-ft. Allis-Chalmers cooler, driven by a 7½-hp. motor, completes the lime plant equipment.

Hydration is carried out with a 2- by 6-ft. premixer and a 4- by 15-ft. hydrator. One 8-ft. Raymond single whizzer mechanical air separator and two Raymond automatic pulverizers complete the equipment.

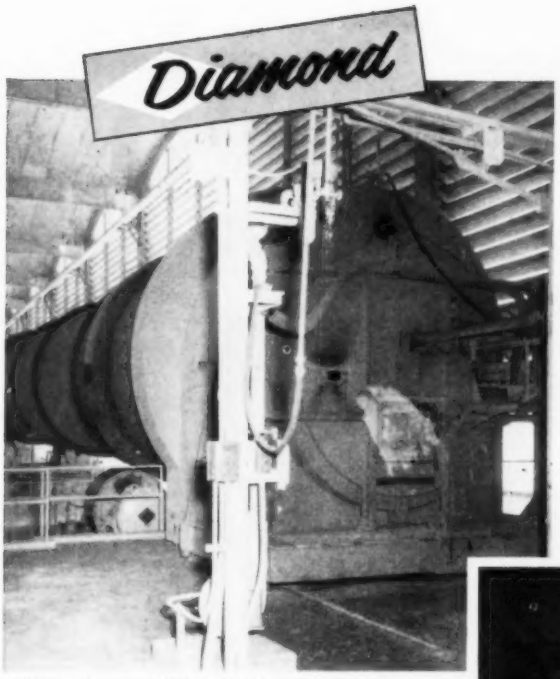
Fuel oil consumption used in firing with oil is at the rate of approximately 1 bbl. per 1.2 tons of quick lime.

As a modern-type housing area is located within a few hundred yards of the plant, considerable money and care has been expended to make the operation as dust-free as practicable. The crushing area dust situation has been improved at least 75 percent through enclosing the dumping area. However, as the quarry is in the same general area, it has not been possible to keep the neighbors entirely happy at all times.

Only one other commercial lime plant is operated in the Hawaiian Islands. The Hawaiian Commercial & Sugar Company, located on the island of Maui, provides lime requirements for that island. The GasprO plant at Waianae supplies the lime requirements for Oahu, Kauai, and Hawaii.

With the sugar and pineapple industries relatively stable, the largest new demand for lime is from the booming construction industry. In 1958 construction valued at almost $190 million was started. This is up sharply from about $155 million in the previous year. Hawaii will undoubtedly continue to expand. The population, now about 635,000 (including military personnel), is expected to increase to approximately 800,000 by 1975. However, development will be largely in service industries. Hawaii's basic sources of wealth—sugar and pineapples—come from the soil. Raw materials are scarce, or non-existent.

WILLIAM H. CRANGLE, president of the Cleveland Builders Supply Company, Cleveland, Ohio, died recently after an illness of several months.



▲ View of cement kiln. "Utiliscope" Camera may be seen at right side.

▲ Close-up of "Utiliscope" Camera watching interior of kiln. Air cooled "Utiliport" protects lens against high temperature.

▼ Control Room. Operator sees kiln interior on TV monitor.

Modern Cement Plants Produce

MORE UNIFORM CEMENT CLINKER with DIAMOND "UTILISCOPE" TELEVISION

Camera Operates Efficiently in High Temperature Area . . . Provides Economy and Better Plant Layout

Close observation of the interior of the kiln is important in production of uniform high quality cement clinker. But to station an operator at an observation port on each kiln is inefficient use of man power. Also placing the instruments and controls in that location hinders good plant layout.

This problem was solved in this plant with a "Utiliscope", Diamond heavy duty Television System. A camera was installed on each of the two kilns to "see" the interior. Monitors in the air conditioned control room enable the operator to keep close watch on the burning conditions. He can continually check on the formation of clinker. Instruments and controls are also grouped in this room, so he can make immediate corrections when they are needed.

High ambient temperature (up to 2100°F at the viewing port) was no serious problem. The Diamond air cooled "Utiliport" provides adequate protection to the camera lens. The "Utiliscope" camera, which is built for tough conditions, is air cooled in this installation.

Diamond Heavy Duty Television is built to stand severe service. High temperature, dust, dirt, vibration, etc. do not impair its dependable operation.

This is only one of many ways in which the Diamond "Utiliscope" can save money, improve operation, and help produce a better product. It has been proved in a wide variety of plants and applications.

Explore the possibilities of "Utiliscope" for *your* plant. Write us for more information.

DIAMOND POWER SPECIALTY CORP.

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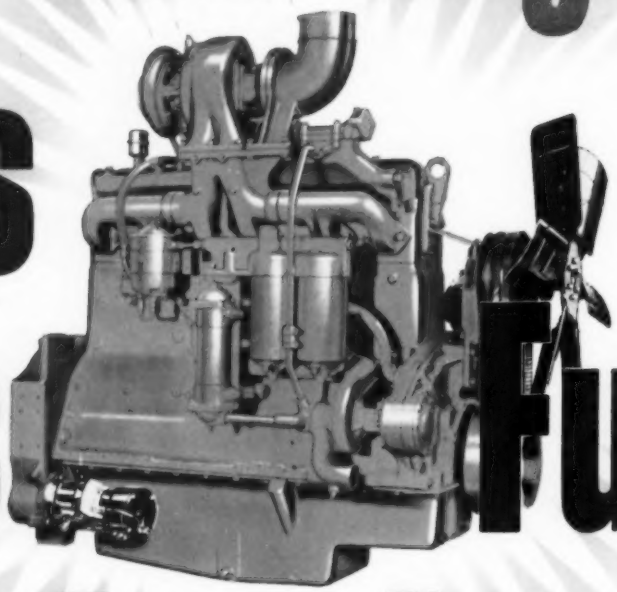
8297

This New Engine Uses Less Fuel Than Any Engine In Its Class



The new Allis-Chalmers 21000 turbocharged diesel engine delivers 340 dynamic horsepower at 2000 rpm — and does it on only ¾ of a cup of fuel, or just .355 lb, — per bhp/hr.

The comparable engine with the next best fuel economy, by published claim, burns between .39 and .40 lb, or almost 10% more.

Another engine in this class burns, according to published claims of the manufacturer, .46 lb per bhp/hr — or 29% more. This means 3 extra gallons to every 10.

The Allis-Chalmers 21000 and companion 16000 (naturally aspirated) engines deliver superior performance because of superior, *advanced* engineering—at least two full years ahead. The famous Allis-Chalmers durability and lugability are still included, too — only more so. Let your nearby Allis-Chalmers dealer show you. Allis-Chalmers, Milwaukee 1, Wisconsin. BE-16

ALLIS-CHALMERS

POWER FOR A GROWING WORLD

Industry Personalities

S. H. Steffey

STEWART H. STEFFEY has been appointed manager of the slag products section, United States Steel Corporation. He succeeds W. Kenneth Dorman, who has been transferred to stainless steel sales.

The newly appointed manager of slag products comes to Pittsburgh from Philadelphia, where he served as assistant to the sales manager in U. S. Steel's sales office. He joined United States Steel in 1946.

ARNOLD ARCH has been named executive secretary of the Air Pollution Control Association by the association's board of directors. He leaves the air pollution control directorship of Niagara Falls for his new post on July 1.

Mr. Arch will also serve as Senior Fellow of Mellon Institute, heading the Institute's APCA-sponsored Multiple Air Purification Fellowship.

He succeeds HARRY PIER, who served as APCA's executive secretary for the last two years after 45 years as a Research Cottrell, Inc., executive.

E. H. Provine

E. H. PROVINE has been appointed assistant secretary of the Glacier Sand and Gravel Company, Seattle, according to William P. Jackson, vice-president and general manager.

Glacier, a Permanente Cement subsidiary, recently acquired the Pacific Building Materials and Ready-mix Concrete Company of Portland, Oregon and Vancouver, Wash., which is now operated as a division of Glacier.

JOSEPH A. LEADABRAND, former manager of the Portland Cement Association's soil-cement bureau, has been appointed assistant to the vice-president for promotion. He succeeds Thomas E. Long, who was named eastern regional manager for the Association.

In his new position, Mr. Leadabrand will report to James D. Piper, vice-president for promotion, who supervises the Association's promotion activities in its general headquarters in Chicago, and six regional and 33 district offices throughout the United States and in British Columbia, Canada.

E. GUY ROBBINS, succeeds Mr. Leadabrand as acting manager of the soil-cement bureau.

M. E. Erland

MELVIN E. ERLAND has been elected vice-president and manager for the Pacific Building Materials Division of Glacier Sand and Gravel Company, Minneapolis, Minn.

Mr. Erland was president and general manager of the former Pacific Building Materials and Ready-mix Concrete Company prior to its purchase by Glacier in February. Glacier is a wholly-owned subsidiary of the Permanente Cement Company.

The appointments of four new field engineers to the California staff of the Portland Cement Association were recently announced.

The new engineers are JOHN A. BAYER, H. ALAN JOHNSON, VERNON E. MALLEY, and ROBERT E. PRICE. Mr. Johnson will be based in San Jose and will work out of the new San Francisco office of the Association. Mr. Price will cover Kern, Santa Barbara, and San Luis Obispo Counties. Both Mr. Bayer and Mr. Malley are field engineers in the metropolitan Los Angeles area.

N. J. Dunbeck

NORMAN J. DUNBECK, vice-president in charge of the Industrial Minerals Division of International Minerals & Chemical Corporation, has been elected vice-president of the American Foundrymen's Society. Mr. Dunbeck was formerly on the Society's national board of directors, and has been active on many of its technical committees.

CHARLES R. FOSTER, former chief of the flexible pavement branch, soils division, U. S. Waterways Experiment Station at Vicksburg, Miss., has been named to the staff of the National Bituminous Concrete Association in Washington, D. C.

As technical co-ordinator, he will head the group's new national research effort toward getting even better quality and control into the construction of bituminous concrete paving of all types.

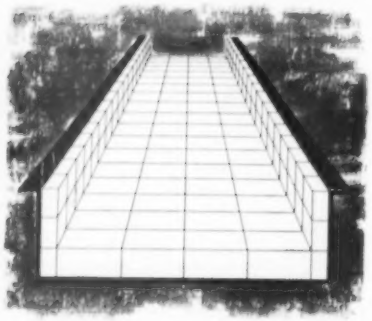
Mr. Foster's chief responsibility will be to plan, promote, install, and co-ordinate individual research projects, which will be sponsored by state asphalt paving associations, public agencies, state colleges and universities, refiners, and distributors and manufacturers.

G. B. Randolph

GEORGE B. RANDOLPH has been appointed sales engineer of Calco Supply Company, San Francisco, Calif. Calco is a wholly-owned subsidiary of the Calveras Cement Company. It is the manufacturer and marketer of the company's new expendable pallets, and a distributor for other corporations in the industrial supply field.

ELMER R. STITT has been appointed sales manager of the Southwestern Portland Cement Company, Fairborn, Ohio.

NEW
LONG
LIFE
FOR
CHUTE LININGS



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ARLCITE
WEAR BLOCKS

High-density Arlcite blocks today are extending the service life of chute and bin linings as much as six times that of hardened steel alloy plates. Extraordinary resistance to abrasion makes this high alumina ceramic the economical choice for lining surfaces exposed to abrasive materials. The patented tongue-and-groove construction insures a tightly-keyed lining which will remain in place under the most severe operating conditions.

Arlcite wear blocks are of the same tough-bond composition as Arlcite high-density mill linings and grinding media supplied to industry since 1936. Write for additional details and new Ceramic Bulletin 1259-P.

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FERRO CORPORATION
East Liverpool, Ohio

Enter 140 on card, page 158

Legal Decisions

On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Cannot Stop Quarry Operations

Last month a higher court rendered an outstanding decision which answers certain questions presented from time to time by operators of quarries, and sand and gravel pits, with respect to the validity of city ordinances which are intended to stop or restrict operations of these plants.

For illustration, in *Caslin Materials Company* v. *City of Monterey Park,* 329 Pac. (2d) 522, the testimony showed these facts: A man, named Caslin, owns the Caslin Materials Company. Since 1937 he has been the owner of a large tract of land in a city. About 70 acres has been used since 1944 as a site for mining decomposed granite. The machinery and structures used in connection with the operation consist of a roofed screening plant and several small buildings, all of which were on the land prior to 1950.

On January 19, 1950, the city passed a zoning ordinance (556), as a result of which Caslin's property was rezoned from industrial to residential-agricultural. On January 9, 1956, another ordinance (727), was passed which expressly prohibits the expansion or extension of presently established plants. Also, this ordinance provides that mining of decomposed granite shall constitute a public nuisance.

Caslin appealed to the court which held as follows:

"Plaintiff (Caslin) had a vested property right in the use of his property as a quarry of decomposed granite of which he could not be constitutionally deprived without due process of law. Having established the nonconforming use, he was entitled to continue his operations as a matter of right. He was not required to obtain a special use permit."

With respect to provisions of the ordinance which prohibited Caslin to extract granite from any new location on his land the court said: "Defendant (City) asserts that by such provision plaintiff (Caslin Materials Company) was limited to excavating that portion of the property already excavated. We do not agree. The very nature and use of an extractive business contemplates the continuance of such use of the entire parcel of land as a whole, without limitation or restriction to the immediate area excavated at the time the ordinance was passed. The rock must be quarried at the site where it exists, or not at all. An absolute prohibition, therefore, practically amounts to a taking of the property since it denies the owner the right to engage in the only business for which the land is fitted."

With respect to operation of the plant being a public nuisance, the court said:

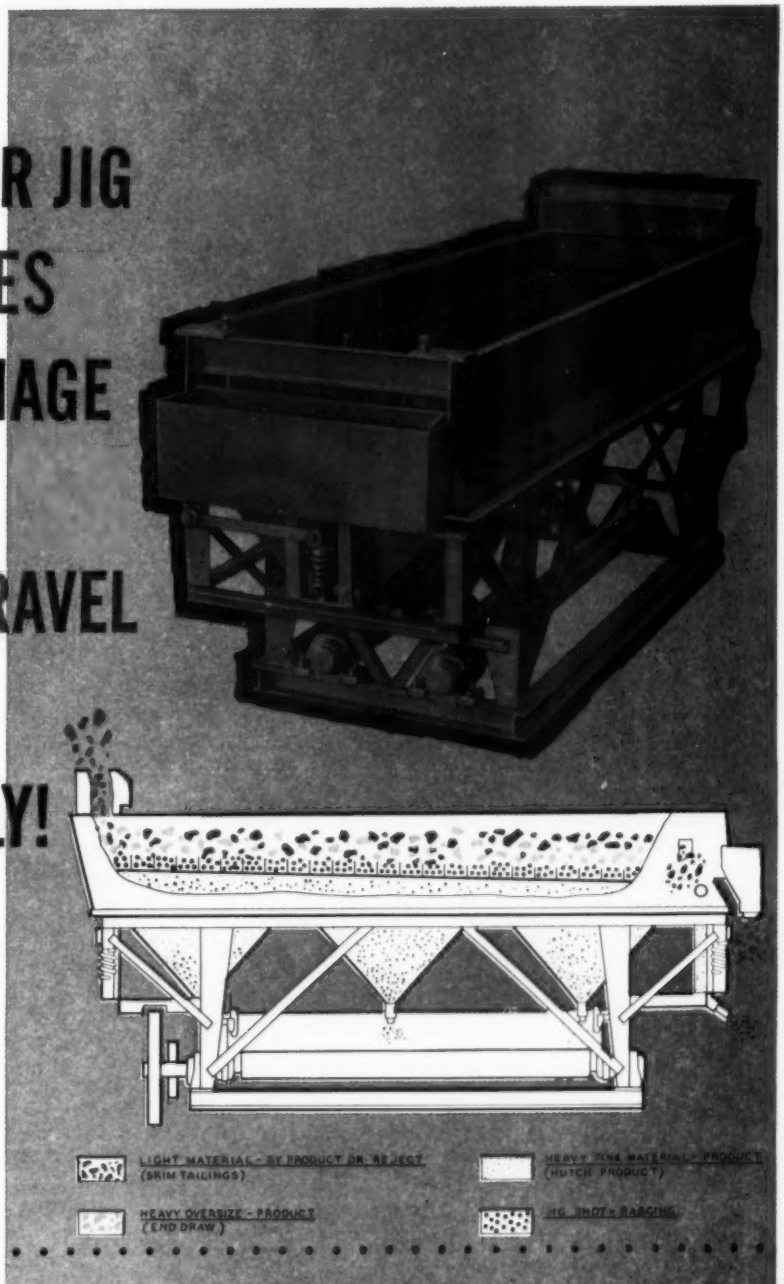
"The ordinances in question cannot find support in the legislative power to prohibit a nuisance. It is established law that the business of excavating rock and gravel is a lawful and useful operation. The evidence is sufficient to support the finding that the operation of the quarry was not a nuisance."

Written Contract Must Stand

Last month another higher court laid down this important law involving lease contracts: If the testimony proves conclusively that both parties to a lease contract made a mutual error, the court will reform the contract to make it read as the parties originally intended it to read at the time it was signed. However, where only one contracting party contends that the contract reads differently than it was intended to read, the court will hold the original contract valid and enforceable.

For illustration, in *Pullar* v. *C. V. Wilder Company,* 332 Pac. (2d)

THE WEMCO-REMER JIG HANDLES LARGER TONNAGE OF SAND AND GRAVEL MORE PROFITABLY!



because only WEMCO meets all these requirements

- High feed capacity
- Ample length of bed to insure full stratification and complete separation
- Uniform porosity of bed for even distribution of vertical water pulsations
- High hutching capacity for full recovery
- The *only* jig that will work on sand

The Wemco-Remer Jig produces specification material from deposits previously unusable because of shale, coal and other lightweight particles. The unique Wemco double-stroke makes the difference: permits use of larger jigging area; gives greater efficiency to the jigging action without dead spots; enables longer, trouble-free operation with minimum maintenance and operation costs.

Find out how the Wemco-Remer Jig can work profitably in your operation.

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Western Machinery Company, *Dept. P. Q.*
650 Fifth St., San Francisco, Calif.
and throughout the world

Here's why a NEW 375-hp International®

CAN OUT-EARN ANY OTHER BIG

In the new 27 cu. yd. 495 Paywagon®, big earning advantages start with the new International DT-817 diesel engine. Forty-ton payloads highball upgrade or over rough and soft spots faster than ever behind the locomotive-like wallop of 375 turbocharged hp—more power per struck yard than any comparable wagon! Next, the "495" Paywagon's exclusive power-opened clamshell doors give positive dumping control—and retract parallel with hopper sides—"clean as a whistle" from wiper plate action! Pull-away clearance, to straddle 60"-high windrows, eliminates dumping delay! Too, the 495 Paywagon has new full 90° turning in either direction; new road-hugging design to gain top mph safely, out and back, at speeds up to 32.0 mph. Plus exclusive extra operator comfort and control features that reward you with extra production!

In the new 24 cu. yd. 495 Payscraper,® exclusive International DT-817 diesel power earning advantages team up with new cutting width and tapered bowl design—to heap-load faster than any other 3-axle scraper of its size. And it hauls at speeds up to 32.0 mph! The scraper's big 131" cutting width promotes fast dirt break-away, permits both unit and pusher to operate within the cut for best traction. Exclusive tapered bowl design boils dirt toward center, reducing side spillage; permitting positive, forced ejection even of sticky or frozen materials. More hp per struck yard than any competitive unit—wheel and bowl leveling adjustment—custom-designed cable control unit—full 90° turns—all team up to make the 495 Payscraper the top producer of its size class!

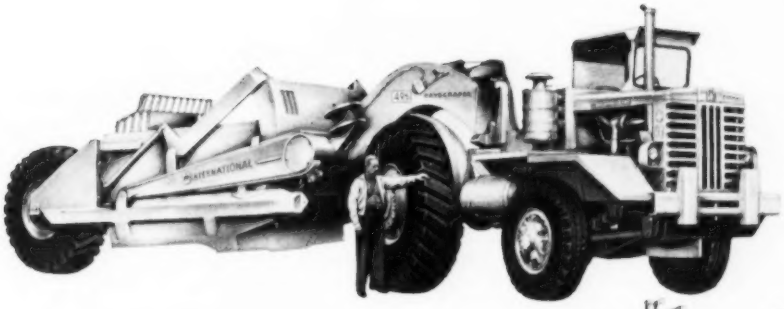
In the new 24 cu. yd. 295 Payscraper—you get the same big-capacity, high-torque engine that powers the 495's: the 375 hp DT-817! You get haul speeds up to 29.1 mph—matched with new automotive comfort and control features, that include a 16-adjustment seat. And the scraper unit of the 2-axle 295 is the same heap-loading, tapered bowl, wide-cut scraper featured in the 495 Payscraper!

Match any new International Earthmover against any similar equipment on your job or in your mind—for capacity, operating ease, low costs and net profit earning ability. See your International Construction Equipment Distributor!

Heaped, the new 375 hp International Paywagon highballs 40.5 cu. yd. (or 40.5 tons) as fast as 32.0 mph. Choose either 4-speed Power Shift or 9-speed constant mesh transmission drive.

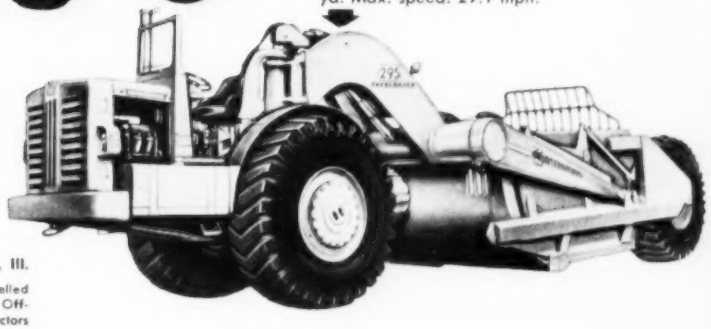
Earthmover

WHEEL RIG ON YOUR JOB!



Controlled with new custom-designed cable control unit, the 375 hp International 495 Payscraper speeds 34 cu. yd. heaped loads up to 32.0 mph. Its apron can "gape" open as high as 98"—for sure ejection of all materials!

Positive-acting air brakes—16-adjustment spring hydraulic seat—unobstructed vision—flush-deck safety—power steering—all add up to production-boosting operator comfort and ease of control of the new 375 hp 295 Payscraper. Heaped capacity: 34 cu. yd. Max. speed: 29.1 mph.



International® Construction Equipment

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

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249, it was shown that a land owner, named Pullar, entered into a written contract with the C. V. Wilder Company, giving to the latter the right to remove gravel from a certain area of Pullar's property.

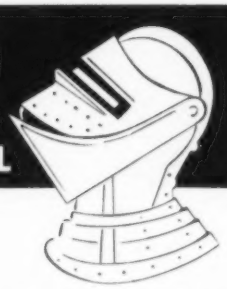
Pullar objected to the C. V. Wilder Company removing gravel beyond a certain fence line, although the contract covered the area.

Pullar filed suit and asked the court to reform the written contract since it gave the company the right to remove gravel beyond the fence but this area had not been intended by either of the parties to be included in the lease contract.

The higher court refused to reform or revise the contract, and said:

"The parties had never agreed that the particular fence would act as the boundary; there was no mutual mistake of fact, and the only definite agreement ever reached was the final written contract."

ARMOR with ADMIRO
HEAT TREATED ALLOY STEEL



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Any type of heavy duty off the road equipment that is repaired with ADMIRO heat treated, high tensile, alloy steel will earn top rating for resisting repeated impact and severe abrasion.

This is the modern protective method that insures lower maintenance and replacement costs, with minimum down time charges.

Recommended Applications: Hoppers, bins, chutes, buckets, core liners, block machine plates, log washer paddles and pans, dozer push blades. Special uses in Mining, Quarrying, Cement and Aggregate Plants.

COMPLETE FABRICATING FACILITIES
Welding — Rolling — Forming
Intricate Shapes Cut to Specification

Immediate service from completely stocked warehouses in Cleveland, Ohio and Dallas, Texas.

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Please send us full information on the uses and economies of ADMIRO.

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Taxes Based on Book Value

Recently an executive of a nonmetallic products plant wrote a letter, in part, as follows: "Some few years ago our sand and gravel partnership business was organized as a corporation. The corporation's directors placed a high book value on the property and assets, which were transferred to the corporation. In fact the corporation's book value is more than twice the value of assets before the corporation was organized. The Federal tax commission claims that we are deficient on tax payments and demands payment of a large amount plus interest, penalties, etc. Are we liable?"

The answer, according to a late higher court decision is no.

For example, in *Commissioner* v. *Newton*, 86 N. E. (2d) 524, the testimony showed these facts: Two men had conducted a sand and gravel business, as partners, for a number of years when the firm organized a corporation. The book value of the partnership assets and property amounted to $121,399, but upon the conveyance of the assets to the corporation these assets were carried upon the books of the corporation as $375,000.

In subsequent litigation, the tax commissioner held that these taxpayers had a "gain" taxable as income because the corporation's book value of assets was nearly three times the book value of assets claimed by the partnership. Hence, the tax commissioner ordered the taxpayers to pay taxes on the difference between $375,000 and $121,399. They appealed to the higher court which promptly reversed the commission's decision, and said:

"At the time of incorporation these assets, which had a book value of $121,399, were more than trebled in value in setting them up on the corporate books. This was a mere bookkeeping device which apparently resulted in the imposition of the taxes in question. There is nothing to show that the increased valuation was the fair market value of the assets. They were worth no more a minute after they were transferred to the corporation than they were a minute before."

For comparison, see *Commissioner of Taxation* v. *Fopi*, 85 N. E. (2d) 776. This court held that if either an individual or partnership

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1½ yd. TROJAN

...Packed with Operating "Extras"

There's no mistaking this new Trojan 124 — a standout performer in any task force, on any job . . . This is the 1½ cu. yd. tractor shovel that you have been asking for . . . The new job-rated Trojan proudly presents an imposing combination of extra operating benefits that can only spell P-R-O-F-I-T to the user.

At no extra cost Trojan offers the safety and greater visibility made possible by Trojan's *patented safety curve arms,* a favorite with tractor shovel operators . . . the maximum stability provided by wide-tread tires . . . 10,000 lbs. rated lifting capacity, highest for any machine of this size . . . greater carrying capacity . . . 40° bucket tip back at carry position . . . full power shift transmission . . . a variety of bucket sizes from 1½ to 2 cubic yards . . . choice of gas or diesel power . . . plus the widely preferred Trojan features that insure low-cost, efficient production on so many jobs today!

Give your Trojan distributor a few minutes of your time. That's all he needs to prove to you that the new Trojan Model 124 can be your most valuable piece of working equipment . . . Ask for a demonstration — see it in action!

Take full advantage of the variety of applications your Trojan 124 can offer, and all other Trojan models as well, with such quick-change attachments as pallet forks, backhoe, snow plow, dozer blade, crane hook and special buckets.

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TRACTOR SHOVELS
YALE & TOWNE

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organizes a corporation and later sells any stock at a greater price than the listed book value of the assets was at the time the corporation was organized, the income taxes must be paid on the resulting profit which is the difference between the cash received for the stock and its listed book value.

Must Pay Full Sales Tax

An official of a company which sells ready-mix concrete asked this question: "If a state law exempts contractors and construction firms from paying sales tax on the materials it uses, can a company which furnishes ready-mix to these contractors and construction companies avoid paying sales taxes on the ready-mix?"

In a recent decision, a higher court held in the negative.

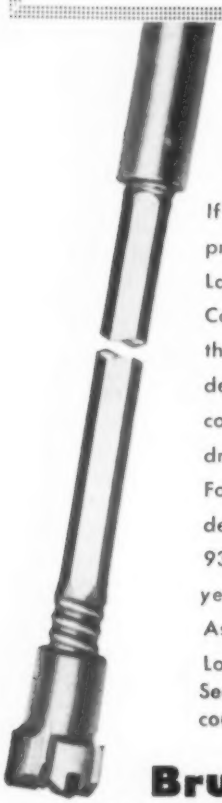
For instance, in *Hayward Building Material Company* v. *State Board*, 330 Pac. (2d) 855, the testimony showed that a state law exempts contractors from paying sales use taxes on materials such contractors use in construction work.

Further testimony showed that the Hayward Building Material Company is in the business of furnishing wet-mix concrete and asphalt to construction contractors. This company purchases dry ingredients such as cement, rock, sand, gravel and other additives, which it compounds at its plant. Upon receiving an order for concrete these ingredients are combined with water in a usual rotating drum attached to a truck and transported from the plant to the building site. By the time of arrival the mixture had become wet-mix concrete, ready to be discharged from the mixing drum on the truck into forms at the job site. The company does not in any way participate in the building of the forms, or their removal after the concrete had hardened. All tamping, troweling, leveling and finishing of the concrete is done by the contractor. During the period from July, 1946, to September, 1949, the company furnished various construction firms with $902,302.29 worth of wet-mix concrete and asphalt. It paid a sales tax on the raw materials at the time they were purchased. No sales tax was collected on the subsequent sale of the prepared product to various construction firms. Recently the State Tax Board assessed additional taxes on the company's gross receipts of the 1946-49 period amounting to $27,904.73. In other words, the state taxing authorities contended that the Hayward Building Material Company must pay the state's 2 percent sales tax on the total amount it collected from the contractors to whom it sold the ready-mix concrete, instead of paying the 2 percent sales tax only on the cost of cement, rock, sand and gravel it purchased to make the ready-mix.

The lower court rendered a judgment favorable to the Hayward Building Material Company but the higher court reversed the verdict holding that this firm must pay the above mentioned $27,904.73 in back taxes, and said:

"Nothing contained in the purchase order can be construed to evidence an intent to engage plaintiff (Hayward Building Material Company) as a construction contractor. In other words, plaintiff was

New ROPE THREAD on Brunner & Lay Drilling Tools



.... makes long-hole drilling EASIER • MORE PROFITABLE

If it's deeper holes you are after, you can't buy more productive tools than the rope thread Brunner & Lay assembly . . . carbide Rok-Bits, Couplings, Carbo-Rok Sectional Rods, Striking Bars. Solid rope thread connections ensure greater rod rigidity for deeper drilling. Rod life is extended – breakage costs reduced. Easy hand uncoupling. An unbeatable drilling unit designed and built to work together. For complete information call your Brunner & Lay dealer, or our nearest plant. Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. *77 progressive years.* Plants & conversion shops: Albuquerque, Asheville, Birmingham, Denver, Dorchester (Boston), Los Angeles, Philadelphia, Portland, Sacramento, Seattle, Lachine, P. Q., Yardley (Spokane), Vancouver, B. C.

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AIR TOOL ACCESSORIES—MOIL POINTS, CLAY SPADES, ASPHALT CUTTERS, etc.

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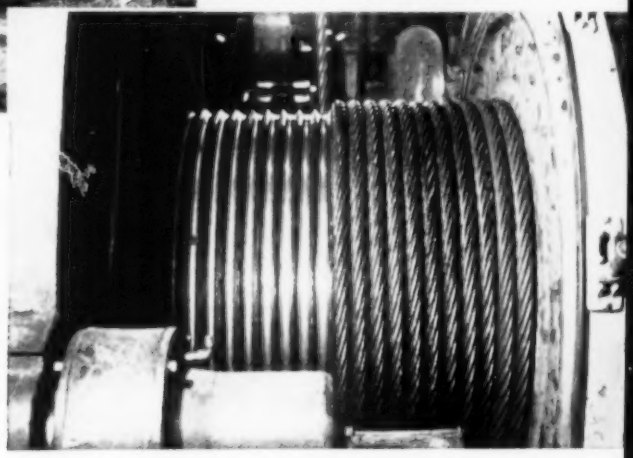
2¾" Tiger Brand hoist ropes going through the boom point sheaves.

40-cubic-yard shovel stripping overburden at the Little Sister Mine of the Truax Traer Coal Company, St. David, Illinois.

Main hoist drum with well-lubricated Tiger Brand Rope in excellent condition after long service.



USS Tiger Brand— America's No.1 Wire Rope used on most big shovels

This 40-cubic-yard shovel, owned by the Truax Traer Coal Company, has been removing overburden at the Little Sister Mine near St. David, Illinois, for more than nine years. The hoist line is a 550-foot, 2⅜-inch diameter Tiger Brand Wire Rope, and the four boom supports are also Tiger Brand.

During this period, millions of cubic yards of rock and earth have been moved, and the Tiger Brand Wire Ropes have given long service life and dependable operation.

Since this 40-cubic-yard shovel went into service, we have seen the size of big shovels advance to 55, 60 and 70 cubic yards . . . and most of these big strippers are equipped with Tiger Brand Wire Rope.

Write now, for our latest booklet on wire rope. American Steel & Wire Division, Room 9125, 614 Superior Ave., N.W., Cleveland 13, Ohio.

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Why Tiger Brand is your best buy

1. It is made by a company that maintains the most complete wire rope research and manufacturing facilities in the country.
2. It is designed by one of the country's most capable staffs of wire rope engineers. It is serviced by thoroughly experienced field representatives always ready with their assistance.
3. Every type of Tiger Brand Wire Rope is designed for specific applications. You get the *right* rope for the job.
4. It is made by one company, U.S. Steel, and every step of production, from ore to finished product, is carefully controlled and supervised to guarantee one high standard of quality.
5. Tiger Brand Wire Rope is manufactured by the largest single producer in the country.

USS American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

not performing work pursuant to construction contracts, but was merely selling a product-wet-mix cement or asphalt. It necessarily follows that plaintiff (Hayward Building Material Company) is not a contractor, therefore the tax would apply to it as a retailer of the products which it manufactures and sells."

Court Awards Extra Payment

Last month a higher court rendered an unusually important decision to the effect that "extra work", as used in connection with a building contract, means work arising outside of and entirely independent of the contract—something not required in its performance, not contemplated by the parties, and not controlled by the contract.

For instance, in *Bolster* v. *Boespflug Construction Company,* 330 Pac. (2d) 831, the testimony showed facts, as follows: A plaster contractor, named Bolster, signed a written contract with the Boespflug Construction Company, a general contractor, to do the interior and exterior plastering work on a school building subject to the plans and specifications for the agreed sum of $201,914. The specifications provided that the general contractor would finish, clean and sandblast all surfaces to be plastered. Before starting plastering, the sub-contractor for the work must inspect all surfaces to be plastered and report to the general contractor any surfaces to be plastered which have not been prepared for plastering.

A clause in the contract provided that Bolster could not recover payment for extra work unless agreed to in writing before the work was done.

After Bolster had started with the work he sent the general contractor a notice that he was ready to proceed with the application of dash coat of plaster on exterior walls but that he was unable to do so because surfaces had not been prepared for plastering. The general contractor denied this, stating that he had properly prepared the walls for plastering. To avoid further delay Bolster proceeded to prepare the walls for plastering. Later Bolster sued the general contractor to recover extra payment for his extra work in preparing the walls to receive plaster. The higher court awarded Bolster extra payment and said:

"There is substantial evidence in the record, both testimonial and photographic, tending to prove the unsatisfactory conditions of the concrete surface of the exterior walls which defendant (Boespflug Construction Company) constructed and on which plaintiff (Bolster) was obligated to apply plaster."

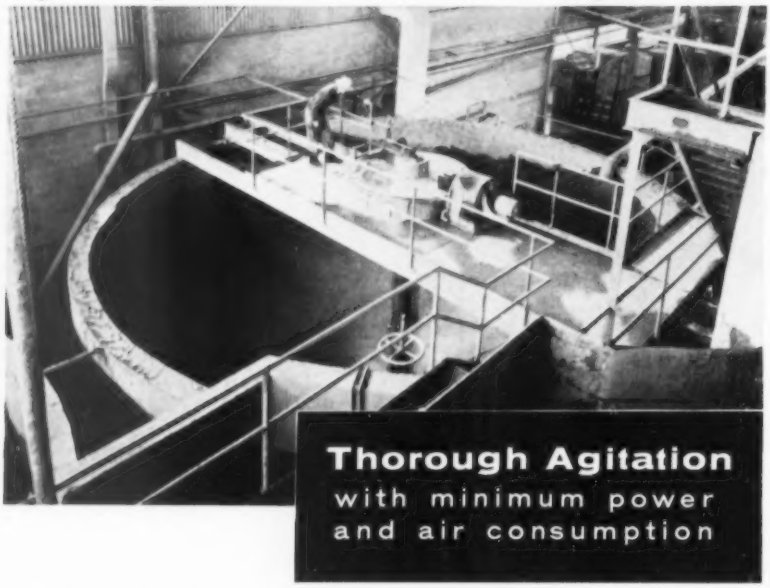
Soap Causes Injury

The owner of a concrete block company asked: "What testimony and proof must our customer, who slipped and fell on a recently scrubbed floor, give to win a law suit for damages which he has filed against our company?"

Generally speaking, the injured customer must prove that negligence of the company's employee caused the injury.

For illustration, in *Brand* v. *Donahoe's, Inc.,* 55 A. (2d) 362, the testimony showed facts, as follows: A customer went into a plant's office, suddenly skidded about three feet and then fell to the floor sus-

Specify MANITOWOC Agitators



Look at the Manitowoc Agitator above, installed in a clay slurry tank 30 ft. in diameter and 25 ft. high. This is but one of dozens of Manitowoc Agitators found in the foremost cement producing plants, both in this country and overseas. These quality conscious operators depend on Manitowoc for complete, uniform and economical slurry agitation . . . *plus* design which permits the installation of agitators in tanks up to 100 ft. in diameter, or larger.

By combining mechanical and air agitation, Manitowoc Agitators maintain consistently uniform particle size and chemical analysis in any type of slurry *without* a continuous application of air. As a result, compressed air consumption and operating costs are substantially reduced. Combine this cost-saving feature with the exclusive Manitowoc Control Valve, scientific air pipe design with an improved check valve, and rugged, channel construction agitator arms and you have the finest slurry agitator for turning out highest quality cement at *your* plant. Write now for detailed, helpful information.

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taining serious injuries. He sued the company for heavy damages contending the company's employee negligently left undissolved soap on the floor which caused him to slip and fall. The testimony showed that the company's employee had been using soap when scrubbing the floor. The higher court held the company liable to the injured customer for $3,000 damages, and said:

"Here, the presence of Ralls (employee) with the bucket, mop and soap is sufficient to identify him as the person whose improper washing of the floor caused the film of soap upon which appellee (customer) skidded and fell."

This higher court went on to explain that if the company's employee had not been there scrubbing the floor at the time the accident occurred, then the customer could not have recovered damages unless he proved these facts: (1) that the company's employee recently had scrubbed the floor, using soap; (2) that the customer slipped on soap which the employee had failed to remove from the floor; and (3) that the customer exercised ordinary care to see the soap and not step in it.

Validity of Truck Taxation

In answer to a recent question it is well to see that generally speaking, a city ordinance is valid which is enacted under the "police power" to regulate traffic on the streets of the city.

In *Rogers* v. *City of Louisville*, 176 S. W. (2d) 387, it was shown that a city passed an ordinance which imposed a license tax upon truck operators but did not apply to non-residents who seldom used the streets. In other words, non-resident truck owners who merely pass through the city occasionally with a motor vehicle and use the streets in isolated instances cannot be made to pay a license tax for operating the vehicle on the city streets.

A trucking company contested the validity of the law proving that its business is hauling sand and gravel between two towns and his trucks are seldom operated in the city, and then only occasionally and incidentally to passing through the city. However, the testimony proved that the company was temporarily engaged in hauling sand and gravel from a river through and beyond the city to various plants outside of the city.

In holding the company bound to pay the license tax the court said:

"One cannot bring his trucks to a city and haul over its streets and escape a regulatory license tax on the ground that he is a non-resident and his vehicles are only using the streets on isolated or casual occasions, such as passing through the city going from one place to another."

Producer Operates Leased Trucks

Considerable discussion has arisen from time to time over the legal question: If a producer of non-metallic products operates leased motor trucks to haul its products, can it avoid payment of motor vehicle fees under a state law which exempts the owners of such vehicles?

Last month a higher court answered this question in the negative.

For example, in *Pete Lien Com-*

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PLIBRICO "80" for extremely high temperatures ...2000-3300° F. Excellent acid and abrasion resistance. 80% alumina; 14% silica. Heat setting. Available with air bond for greater strength.

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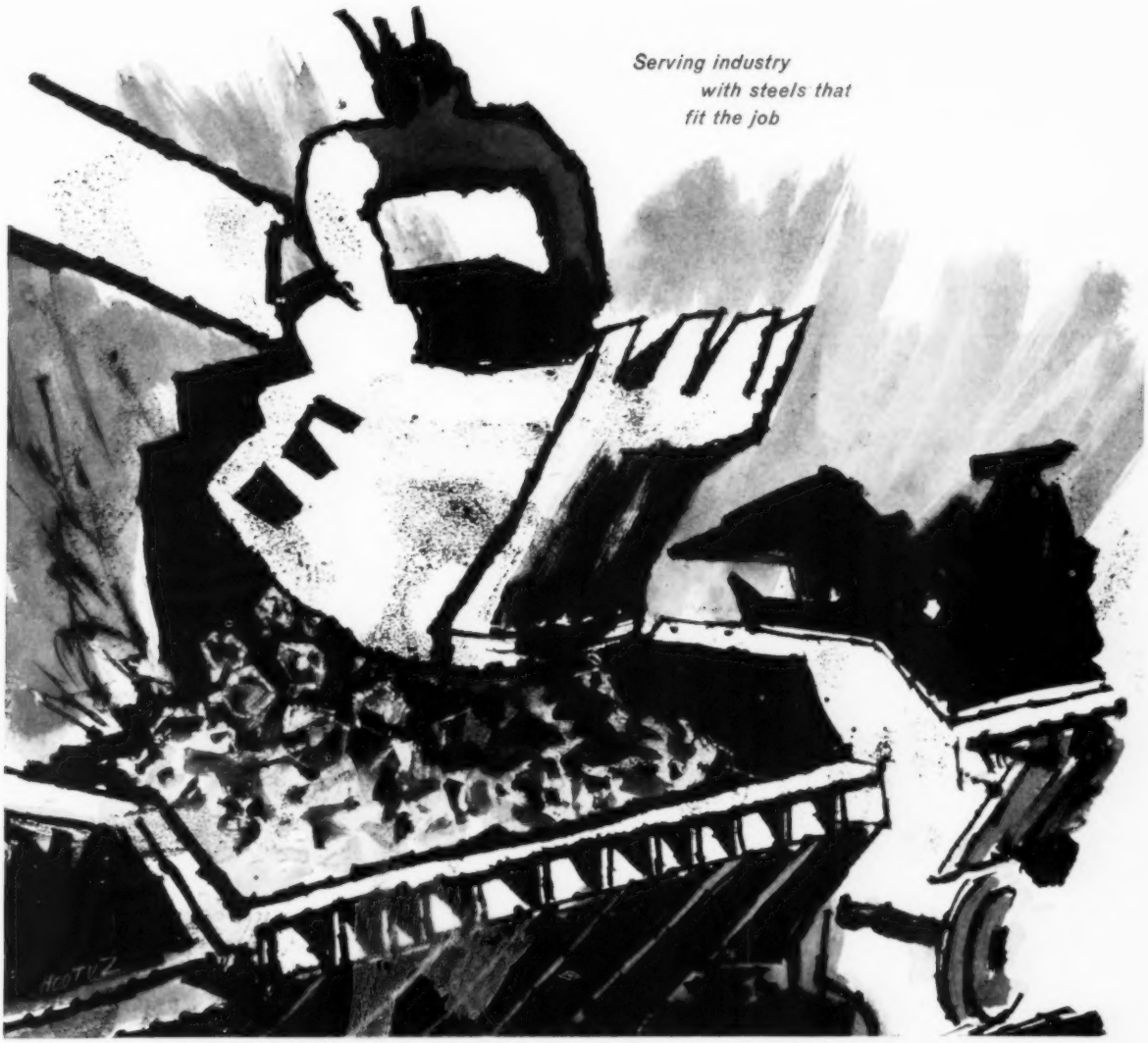

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Where the going gets rough, versatile Lukens "T-1" steel fights back. For repair or modification of heavy duty equipment such as truck beds, chutes, bucket teeth and dozer blades, this special duty steel plate can be ordered from *warehouse stock* in a wide range of plate sizes and gages. Lukens "T-1" is the modern mining steel—you can work and weld it in the field as readily as in your shop. Its terrific resistance to abrasive impact—coupled with an extremely high yield strength—means fewer replacements and often greater payloads. That's why more and more equipment builders are using Lukens "T-1" to provide longer life in shovel buckets, trucks and other mining equipment. Remember to specify the extra-tough 321 min. BHN quality. For performance and application details, request our special booklet, "Lukens 'T-1' for Toughness." Address Manager, Application Engineering Dept., 069 Services Bldg., Lukens Steel Company, Coatesville, Pennsylvania.

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LUKENS ®

pany v. County Treasurer, 92 N. W. (2d) 922, a state law was litigated which provides that motor vehicle compensation fees need not be paid on motor vehicles used in the transportation of products, etc. produced from farming, mining, or logging or excavating operations, if such vehicles are owned by the one producing these products. In other words, the state authorities recognized that the use of heavy motor trucks over the highways tends to subject the highways to unusual wear and impairs the highway disproportionately to the travel thereon by the general public, whereby additional compensation must be paid to the state by operators of heavy vehicles excepting farming, mining, logging and excavated products transported in motor vehicles owned by the producer or owner of such products.

The testimony showed that Pete Lien Company is in the business of operating limerock mines. This company leased motor trucks from various owners to haul its limerock. The Pete Lien Company contended that the word "owner" appearing in the law includes a lessee.

The higher court held that the Pete Lien Company must pay compensation fees to the state for operating these motor trucks, and said:

"The word 'owner' means 'one who has the legal or rightful title, whether the possessor or not'. If the term is to be given its ordinary meaning, plaintiffs (Pete Lien Company) were not the owners of the motor vehicles operated by them. The exclusion extended only to a transporter carrying his own products in a motor vehicle actually owned by him."

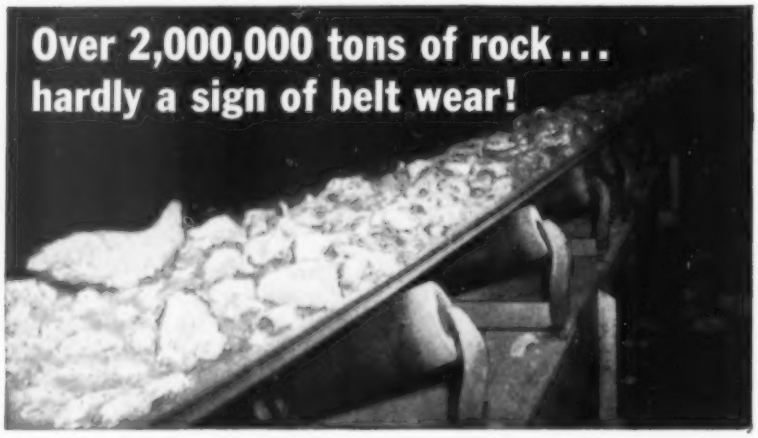
This court went on to explain that a state has a legal right to make a special and unusual law relating to the use of a public highway and the legislature may prohibit or regulate as it may deem proper.

Of course, all courts look through subterfuge which a motor truck owner sets up to avoid state laws. In a late case, for example, a higher court held that a corporation cannot avoid state laws by leasing its trucks and drivers to an independent company or firm although the latter did not violate laws in use of the trucks. This matter of leasing motor trucks has been before the courts many times in the recent past, and the courts very consistently hold that any and all agreements and contracts are void which are intended to avoid state and city laws which regulate the operation of the trucks or tax them specifically. The fact that bookkeeping systems appear to avoid these laws is not conclusive.

Aided by a yearly grant of $3,000 from the American Potash Institute, a three-year research project has recently begun at the University of California at Berkeley, to determine the effects of potash deficiency, acidity, and other factors on the occurrence of internal black spot in potatoes.

CHARLES R. FOSTER, recently affiliated with the National Bituminous Concrete Association, has been named co-ordinator of research in charge of the N.B.C.A.'s national research effort.

Over 2,000,000 tons of rock... hardly a sign of belt wear!



That's the story behind the New York Rubber Stonore Nyrex conveyor belt, in regular, daily use by a large stone company. In this crushed stone plant, this heavy-duty belt carries stone from the primary crusher, located under the floor of the pit, over a belt distance of 455 feet at a 19° angle.

A belt *has* to be good to stand the tension required here *and* hold up under the abrasive effects of the crushed stone at the same time! Yet, this is the kind of service that is expected – and achieved regularly – with conveyor belting manufactured by New York Rubber Corp.

Take Stonore, for example. Highest in quality, mildew-proof, and built for the most severe service, it successfully handles heavy ores, trap rock, crushed stone, coarse broken glass, slag, cement clinkers, and direct feed from digging and mining machinery. It is also available as a special mucker belt.

If you want the service that this belt provides — or need any other type conveyor belt — it will pay you to consult New York Rubber. Drop us a line — there's no obligation. Address: Department PQ-4.

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To supply water for their Pioneer and Simplicity washing and screening plant, the Nello L. Teer Company, Erwin, N. C., uses a Marlow 6G3S pump powered by an International-Harvester engine. The pump, located on the bank of a river, carries the water up a steep hill to the plant, a half mile away. On continuous operation, the pump delivers 54,000 gallons per hour, but *can* handle up to 66,000 gallons per hour during peak periods!

Fred Byrd, Superintendent of Operations for the Teer Company, said that the plant has a capacity of 1,400 tons per 10 hour day and uses 540,000 gallons of water. The plant produces sand and gravel up to 1¼ inches in diameter and is used on their own construction jobs as well as sold commercially to other construction firms. Serving the washing and screening plant is an Eagle Screw, Barber Green Conveyor Belts and a Telsmith Gravel Crusher.

Mr. Byrd is well pleased with the performance of his Marlow pump. He says it runs 10 hours a day without interruptions and gives him all the water he needs to meet his requirements.

Let Marlow help you solve your pumping problem. Write today for information on the complete line of A.G.C. rated pumps and famous Marlow Mud Hogs for handling muddy and trash-laden water. Ask for Bulletin CO-4 and the name of your nearest Marlow dealer.

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More Information, Please

Use postcard to receive literature or details on new equipment and products reported in this issue.

THE SIMPLEX 2-PART REVERSIBLE POINT TOOTH is pictured and described in a buyer's guide offered by *American Manganese Steel Division, American Brake Shoe Company.* Included in the brochure are tables indexing the dippers most likely to be found on various shovel models and the Amsco Simplex adapters which fit these dippers. **(301)**

CLOSED CIRCUIT TELEVISION applications in heavy industry are described in a 4-page bulletin available from *Diamond Power Specialty Corporation.* Bulletin 1194 lists 30 applications ranging from ore mining through product finishing operations, and includes capsule case histories of 5 major systems for heavy industry. **(302)**

A 2½-CU. YD. SHOVEL, the Model 3100, is detailed in a catalog published by *Manitowoc Engineering Corporation.* Full specifications are given for the unit, which is convertible to crane, clamshell, dragline, or trench hoe. **(303)**

"INDUSTRIAL WEIGHING THROUGH ELECTRONICS," a 12-page booklet issued by *Streeter-Amet Company,* explains the history and development of electronic weighing, theory of operation, instrumentation, economic considerations, and general data for instrumentation and remote recording. **(304)**

HOW TO LOCATE SUBSURFACE SAND AND GRAVEL with the Michimho Vibroground is explained by *Associated Research, Inc.,* in a newly-published booklet. This portable instrument gives direct readings of earth conductance to determine soil contour profiles, detailing the type, location, and depth of individual soil layers without test boring. **(305)**

LOSSES DUE TO WIRE ROPE FATIGUE can be curbed by following suggestions offered in Red-Strand Service Bulletin No. 105, published by the *Leschen Wire Rope Division, H. K. Porter Company, Inc.* The bulletin explains the importance of the proportion between the diameter of wire rope and the diameter of sheaves and drums on which it runs, and presents a formula to answer the problem. A table shows the relative bending life of major wire rope constructions and suggestions concerning reverse bends and fatigue damage caused by end attachments. **(306)**

STEEL AND ALUMINUM DUMP BODIES of advanced design are covered in a booklet available from *Galion Allsteel Body Company.* Light-, medium-, and heavy-duty frame-type dump trailers, including single and tandem axle transporters and tandem axle excavator models are pictured, along with electrically-powered and power-take-off type hydraulic tailgates. Hydraulic hoists are also described. **(307)**

REPLACEMENT PARTS for most makes of tractors are featured in a brochure issued by *Columbia Steel Casting Company, Inc.* Included are photos illustrating Columbia's wide range of production capabilities, and typical tractor replacement components manufactured by the firm. **(308)**

"CEMENTS, MORTARS, COATINGS— Co-ordinated to the Furnaces of Industry," is the title of a newly-published booklet released by *Mexico Refractories Company,* providing data on the firm's expanded line of products for furnace savings. **(309)**

SCHIELD BANTAM MODEL T-350, an 11-ton carrier-mounted crane-excavator, is described and illustrated in a 12-page feature bulletin. The complete line of crane carriers available for mounting and the complete line of front-end attachments plus standard and optional features found on the T-350 upper unit are described. **(310)**

THE STORY OF NYLON CORE BELTING is presented in a booklet published by *L. H. Shingle Company.* Summarized are the salient facts about this new type of flat transmission belting, beginning with its inception in wartime Germany, its adoption throughout Europe and Great Britain, and its increasing use in America. Subject matter includes a description of how nylon core is made. **(311)**

AQUABLAST HIGH-PRESSURE WASHERS, manufactured by the *John Bean Division, Food Machinery & Chemical Corporation,* discharge water under pressures of 600 lb. or more at the gun nozzle. Descriptive literature containing pump specifications, general specifications, and data on accessories is offered. **(312)**

June ***PIT AND QUARRY*** **1959**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

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TYPE WT, 1-CU.YD. EXCAVATOR, 25-ton crawler crane, and 30-ton rubber mounted crane, is detailed in Specification Catalog No. 200-3, published by *Insley Manufacturing Corporation.* Specifications, working ranges, and lifting capacities are included. **(313)**

POWER TRANSMISSION MACHINERY available from the *Dodge Manufacturing Corporation* is reviewed in a bulletin including Flexidyne dry fluid drives and Para-flex cushion couplings, plus illustrated descriptions of such Taper-Lock products as steel conveyor pulleys, roller chain drives, various types of shaft couplings, and the Dyna-V line of V-belt drives. **(314)**

TIPS FOR SERVICING DIESEL EQUIPMENT in preparation for the summer months are presented in an informative article entitled "Springtime Tonic," which appears in a recent issue of *Service Topics,* a publication of the *Detroit Diesel Engine Division, General Motors Corporation.* **(315)**

A MINING EQUIPMENT CATALOG issued by *International Harvester Company* covers International Drott underground mining Skid-Shovels, crawler tractors, Payhauler trucks, and engines. Photos and sketches show International equipment in action on jobs such as stripping, surface and underground mining, nonmetallic mining, building haul roads, and cleanup and maintenance. **(316)**

CLEANING TIME ON WET-TYPE DUST COLLECTORS has been cut from as much as 8 hours to 1½ hours out of each 40 hours of operation, according to actual case histories compiled by *The North American Mogul Products Company.* The company produces a non-toxic cleaner especially designed to keep wet-type dust collectors operating at peak efficiency. **(317)**

AIR, SPRAY, AND WELDING HOSE FITTINGS for industrial rubber hose applications are detailed in LE-HI Bulletin No. 198, issued by *Hose Accessories Company.* The 4-page bulletin supplies complete information on the numerous types available. **(318)**

A COMPLETE LINE OF MOTORS, both a.c. and d.c., gearmotors, and adjustable speed drives are featured in a bulletin from *The Louis Allis Company.* The characteristics and modifications for 20 basic types of motors and drives ranging from ¾ to 2,000 hp. are summarized. **(319)**

OWNERS OF DIESEL ENGINES will be interested in an Engine Log Book published by the Engine Division, *Caterpillar Tractor Company.* This book covers 13 months of operation and contains space for daily entries on fuel and lube oil consumption, parts, service, repairs, etc. Monthly entries can be transferred to a handy 12 month summary sheet. **(320)**

THE 3-AT COMPRESSOR, a horizontal, water-cooled, single-stage, heavy-duty compressor, is covered in literature released by *Pennsylvania Pump & Compressor Company.* Photographs, line drawings, and cross-sectional views illustrate the construction of this compressor, showing details of component parts. Sizes, capacities, and ratings are listed in tabular form. **(321)**

STANDARD INSTRUMENT AND CONTROL PANELS available from *Bailey Meter Company* are described in Product Specification G71-7. Details of construction, dimensions, weights, instrument mounting, and accessories are presented, in addition to standard procedures for tubing and wiring. **(322)**

"MERCO CENTRIFUGAL SEPARATION for the Process Industries" is the title of Bulletin 2606, prepared by *Dorr-Oliver Incorporated.* This literature describes design, operation, and features of Merco centrifugal separators for 5 basic liquid-solids applications. Included are photos and drawings of individual units, their component parts, and operating installations and specifications for each unit. **(323)**

A NEW BIN VIBRATOR CATALOG from the *Syntron Company* describes pulsating-magnet electric vibrators for keeping stubborn bulk material and bulk parts free flowing from bins, hoppers, and chutes. Illustrated pages give complete descriptions, data, and specifications for 14 standard vibrators ranging from the 2-lb. V-2 model to the 950-lb. V-600. **(324)**

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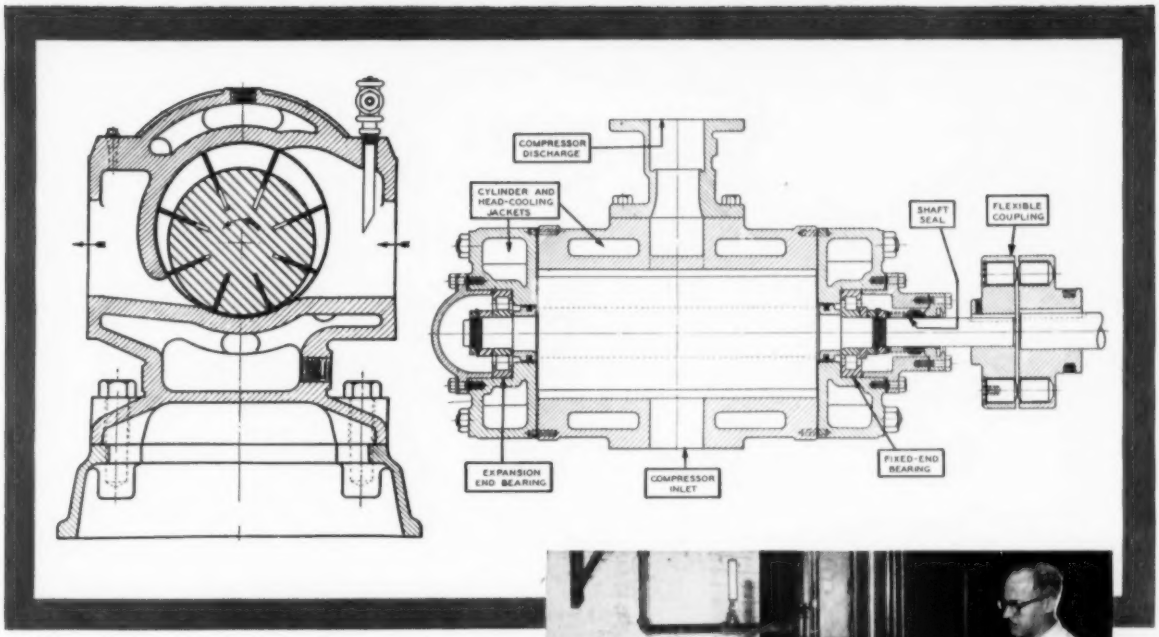

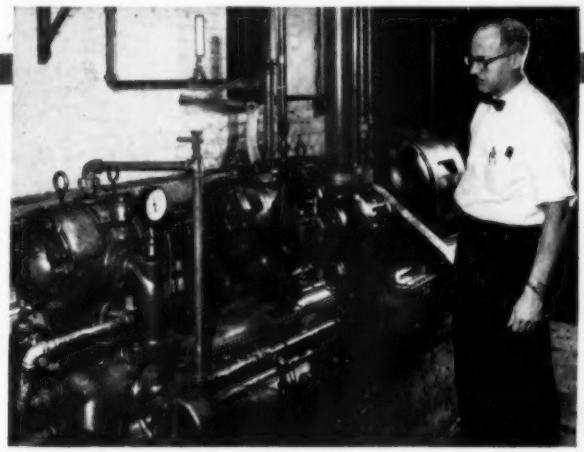

Hard service never affected this Fuller rotary's original output—230 cfm. of air at 90 lb. G., reports Mr. Schott, chief engineer, Thomas C. Wilson, Inc., Long Island City, N.Y.

FULLER ROTARY COMPRESSOR RUNS 13 YEARS WITHOUT DOWNTIME

A Fuller rotary at Thomas C. Wilson, Inc. got its first maintenance shutdown recently, for renewal of roller bearings and rotor vanes—after running without downtime since 1945.

4 years of 24-hour service. The Wilson plant makes tube cleaning equipment, tube expanders and portable pneumatic tools, and so makes heavy daily demands on shop air. For the first four years, three-shift operation kept the Fuller rotary running round the clock. Since 1949, it's been working eight-hour shifts.

Simple design means trouble-free service. Besides bearings, the only moving parts in a Fuller vane-type rotary compressor are the cylinderical rotor and the blades. These compensate for wear automatically. Cylinder head slips off, permitting blade and bearing inspection in a matter of minutes.

Compact and vibration-free. Direct-drive system saves space. Simple, rugged design gives constant service without extensive supervision. Thus, Fuller rotaries can be installed out-of-the-way—on upper floor, on balconies, in basement corners, using low-cost, light-weight foundations.

1189
C-340

Write today for detailed information on the full line of Fuller rotary compressors for in-plant services, gas gathering, and industrial refrigeration.

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SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
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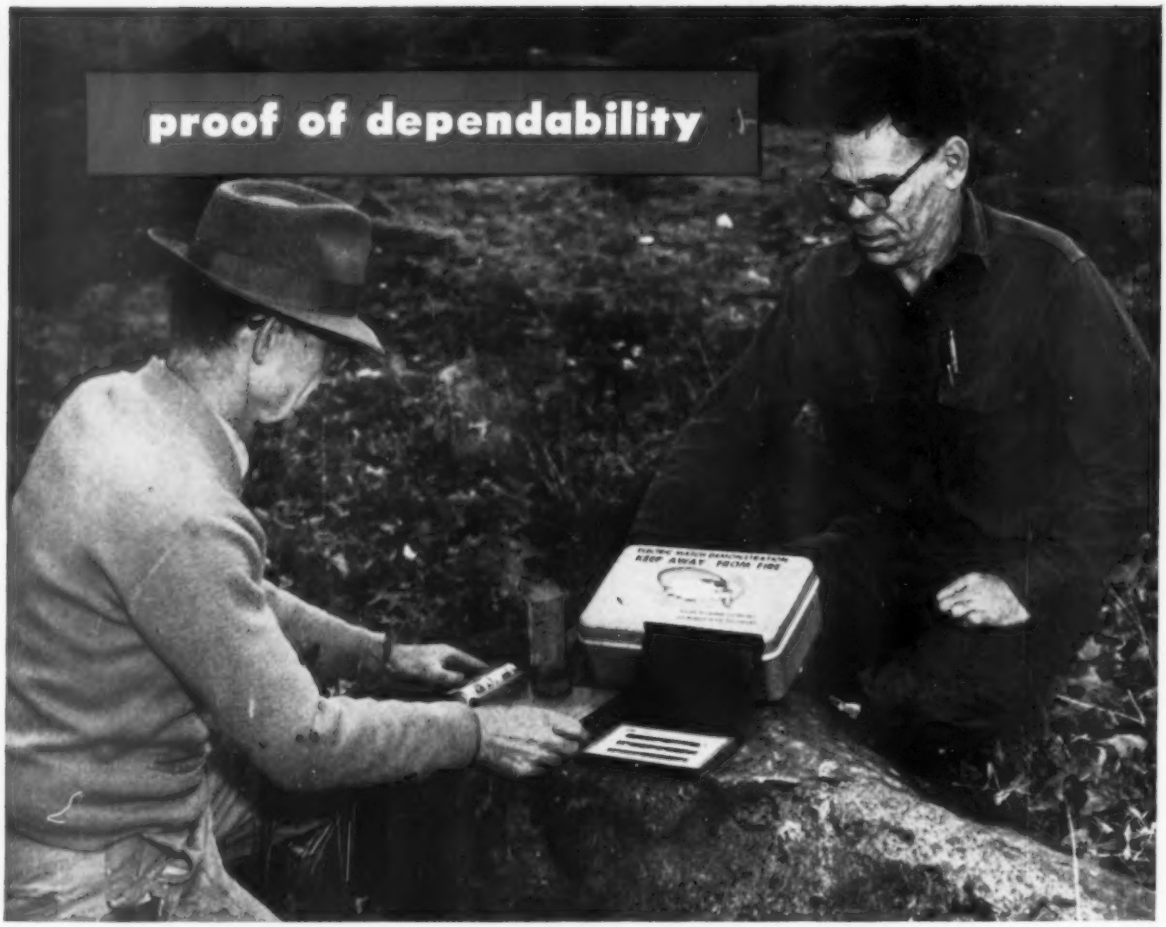
PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930



See this Demonstration!

Your Atlas Representative Can Show You Actual Performance of Unique Electric Match Contained Only in Atlas E.B. Caps

All Atlas Electric Blasting Caps are fired with tiny electric matches so dependable that the armed services use thousands of them in missiles and rockets.

You can prove for yourself how sure-fire Atlas caps really are. Your Atlas representative has an interesting test firing kit to show you. Pick a match at random from his stock and fire it yourself . . . see how it can be depended on to fire in your blast hole.

Your Atlas man can show you *why*, too. Every part of every Atlas match is pre-tested, and the match is completed by multiple dips in high quality flash compounds.

Your Atlas representative will be glad to show you this demonstration, and to help you use Rockmaster and regular Atlas E.B. Caps for dependable initiation and timing to get effective, economical blasting.

EXPLOSIVES DIVISION
ATLAS POWDER COMPANY
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Write for your copy of the new 60-page Handbook of Electric Blasting by D. M. McFarland and Guy F. Rolland.

Manufacturers' News

Gill Drilling Equipment Company, Inc., North Branford, Conn., has been appointed a distributor for the line of blast hole drills, parts, and drilling and fishing tools manufactured by the Bucyrus-Erie Company, Richmond, Ind.

The new distributor's territory includes the District of Columbia, New Jersey, the New England states, and portions of New York, Pennsylvania, Maryland, and Virginia.

Equipment servicing and warehousing facilities are maintained at the distributor's plant at North Branford. A complete parts and tool service will be maintained.

The company is operated and managed by W. Irwin Gill, president, and O. B. Gill, vice-president.

The Warner Electric Brake & Clutch Company, Beloit, Wis., has appointed JOHN A. MURRAY of Winnipeg, Man., Canada, as sales representative. Mr. Murray's territory will include Alberta, Manitoba, Saskatchewan, and western Ontario.

The conclusion of the purchase of Traylor Engineering and Manufacturing Company, Allentown, Pa., by an exchange of stock was announced in a joint statement by Fuller Company, Catasauqua, Pa., and Traylor. Traylor will operate under Fuller management, and personnel and facilities will otherwise remain unchanged.

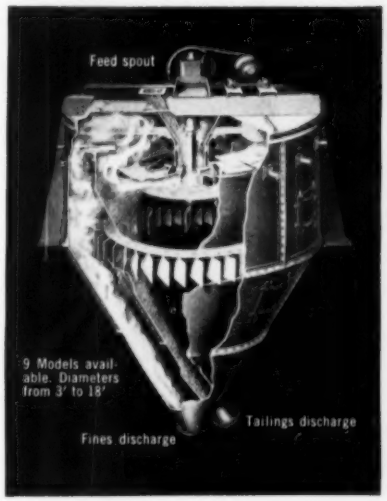
An integrated and complete line of major equipment, required for a cement, lime, or similar manufacturing plant is offered under this single responsibility.

FRANK CANNON has been named eastern regional sales manager of the Owens-Illinois Multiwall Bag Division, succeeding GEORGE S. HARVEY SR., who will continue to serve as sales representative in the New England area with headquarters in Boston. Mr. Harvey has 33 years' experience in this field.

Mr. Cannon, with 10 years' experience in selling multiwall bags, was Philadelphia sales representative at the time of his appointment.

George Schanerman, assistant engineer of maintenance equipment for the Baltimore & Ohio Railroad, accepts the papers from Ralph Cobey, president of the Perfection Steel Body Company, Galion, Ohio, on the first of a fleet of 491 trucks to be delivered to the maintenance department of the railroad. The GMC trucks will be equipped with Perfection's heavy-duty platform stake bodies. These 16-ft. bodies are equipped with winch wells and carry express-type tail gates. A number of the trucks will also be equipped with Perfection Minute-Man hydraulic lift gates.

In Cement and Aggregates the Word for Air Separation is "Sturtevant"



in cement . . .

Sturtevant Air Separators make possible highly efficient closed-circuit systems. Large circulating loads increase output, eliminate overgrinding. Ball and lining life lengthens, power costs are lowered. Top quality cement results from precise control of finenesses. Standard 16 ft. Sturtevants deliver raw fines up to 70 tph, finished fines up to 260 bph.

in aggregates . . .

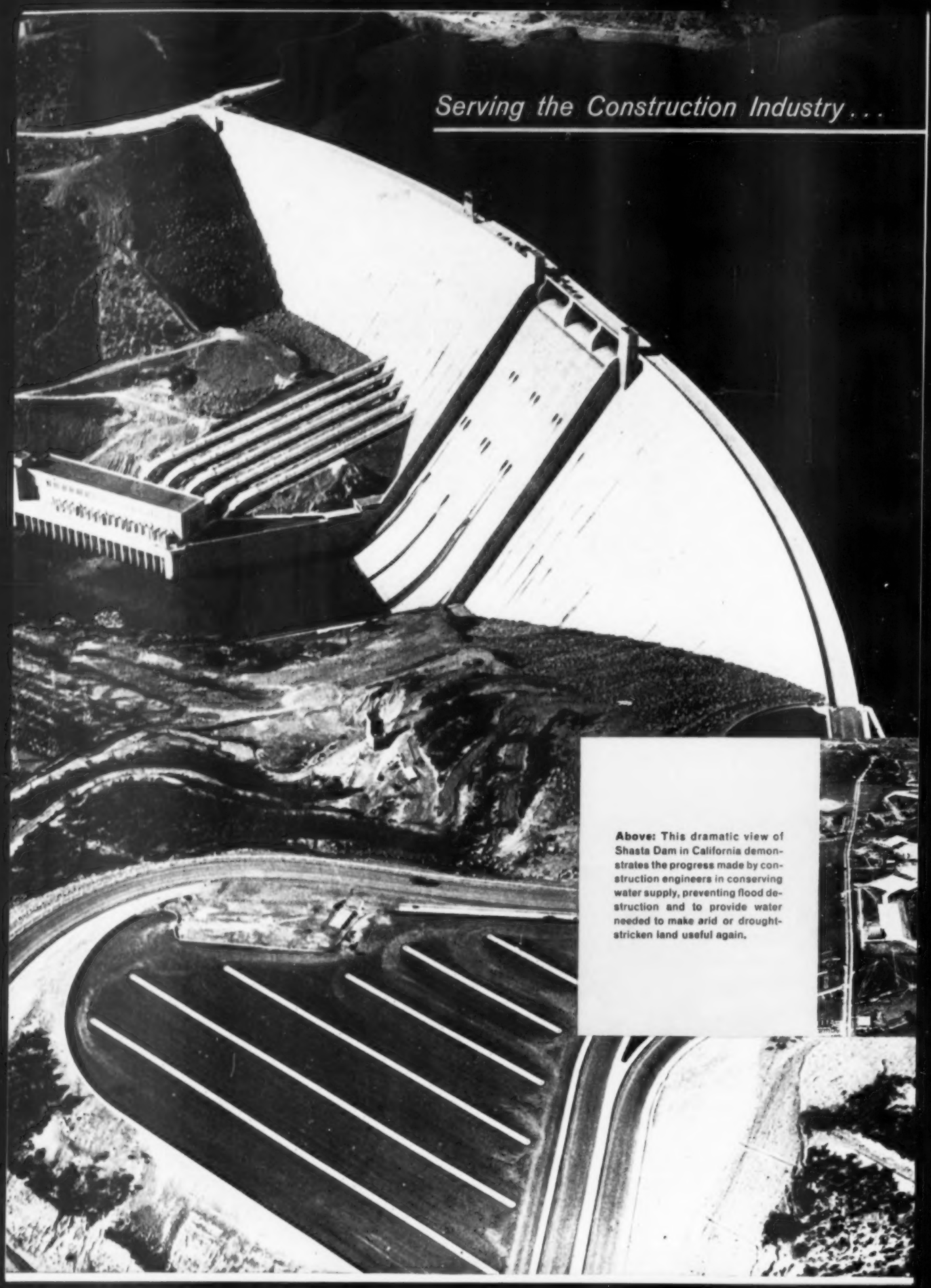
Sturtevant Air Separators classify sand without water, clean sand by de-dusting it. Pre-classification by air can also increase screening production by removing screen-blinding fines. In blending operations, Sturtevants select desired fines from grinder throughput. This graded product is then used to overcome fineness modulus deficiencies.

Send for Air Separator Bulletin No. 087.

STURTEVANT
MILL COMPANY
104 Clayton St., Boston, Mass.

Crushers • Grinders • Micron-Grinders • Separators
Blenders • Granulators • Conveyors • Elevators

Enter 159 on card, page 155



Above: This dramatic view of Shasta Dam in California demonstrates the progress made by construction engineers in conserving water supply, preventing flood destruction and to provide water needed to make arid or drought-stricken land useful again.

Enter 160 on card, page 155

SYMONS® CONE CRUSHERS

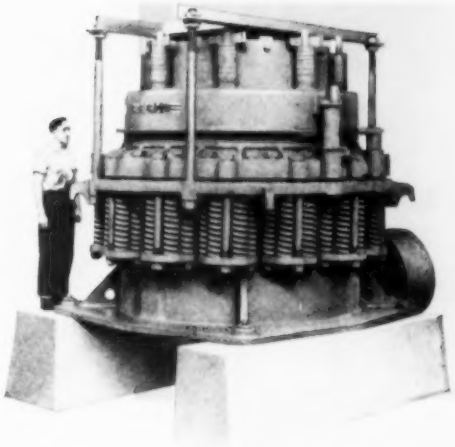
produce big tonnages of quality construction materials at low cost per ton

Illustrated here are typical examples of the vast contributions to the progress of mankind being made by the construction industry. Technological advancement in civil engineering of huge construction projects such as these call for rigid specification aggregates, crushed sand and cement. To meet the constantly growing demand for vast tonnages of these quality construction materials, Symons Cone Crushers have long been the first choice of leading producers throughout the world.

For in the production of construction materials . . . *as in all of the great ore and industrial mineral operations the world over* . . . there has been no record to equal the performance of Symons Cone Crushers that have so consistently and efficiently produced great quantities of finely crushed product at low cost.

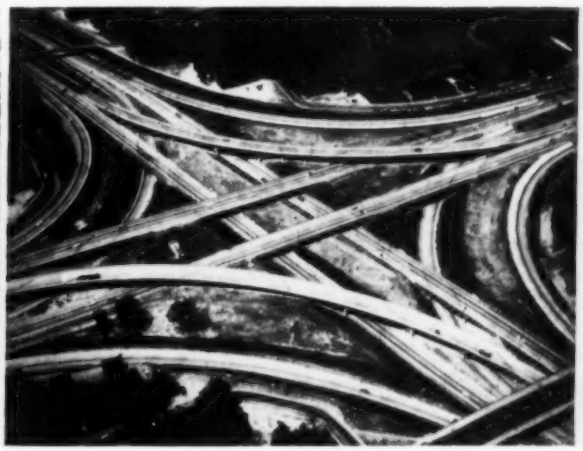
Whether you are a contractor, operator, construction engineer, designer or manufacturer, it will pay you to specify and use Symons Cone Crushers . . . as well as the other Nordberg Machinery for the construction industry . . . *all* designed and built to deliver maximum output at lowest possible cost. *Write for literature.*

SYMONS . . a registered Nordberg trademark known throughout the world



SYMONS CONE CRUSHERS

. . . the machines that revolutionized crushing practice . . . are built in Standard, Short Head, and intermediate types, with crushing heads from 22 inches to 7 feet in diameter—in capacities from 6 to over 900 tons per hour.



Far left: To meet the challenge of the jet age, engineers and contractors are being called upon to build and expand airport runways to handle the ever-increasing traffic. (View shows Lambert Field, St. Louis).

Left: This view of one of the interchanges on the high speed Detroit expressway is a striking example of the contribution the construction industry is making to the tremendous highway expansion program.

©1959, N. M. CO.

C559

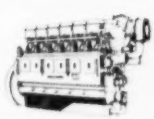
SYMONS PRIMARY GYRATORY CRUSHERS

NORDBERG GRINDING MILLS

SYMONS VIBRATING SCREENS

SYMONS VIBRATING GRIZZLIES

ROTARY KILNS and COOLERS



NORDBERG ENGINES

NORDBERG MFG. CO.
Milwaukee 1, Wisconsin

NORDBERG

NORDBERG MACHINERY

ATLANTA CLEVELAND DALLAS DULUTH HOUSTON KANSAS CITY MINNEAPOLIS NEW ORLEANS NEW YORK ST. LOUIS
SAN FRANCISCO TAMPA WASHINGTON TORONTO VANCOUVER JOHANNESBURG LONDON MEXICO, D. F.

Just like finding 6,000 tons of SAND per week...

... with H & P Cyclones, recovery costs are only a few pennies per ton

Ward Sand & Gravel of Palmyra, N. J., installed ten 14" dia. —14° H & P CYCLONES and now recovers 6,000 tons of salable sand per week. This sand meets New Jersey State asphalt-sand specifications. No need to dredge the stream any more to prevent excessive build-up of waste sand.

These H & P Cyclones operate by gravity feed with 17' of head pressure and process about 4,000 GPM. Deleterious earth is removed with the water in the overflow. *The underflow is good sand... thousands of tons of it...*

IT'S MONEY IN THE BANK!

H & P Cyclones can do the same for you!

Write for brochure 1157, or request a visit.

HEYL & PATTERSON, inc.

55 FORT PITT BLVD., PITTSBURGH 22, PA.

Enter 162 on card, page 155

LeTOURNEAU LW WESTINGHOUSE

Illustrated above is the design which will be used as a new trademark by the LeTourneau-Westinghouse Company of Peoria, Ill. This trademark will appear on all earthmoving, construction, heavy materials handling, and logging equipment manufactured by the firm.

CHELSEA R. PHILLIPS, sales manager in Hibbing, Minn., for Hewitt-Robins, Inc., Stamford, Conn., has been promoted to the position of Chicago district sales manager of the company's Robins Conveyors Division, with headquarters at Melrose Park, Ill.

Hewitt-Robins' new Hibbing sales representative will be PAUL D. WILLARD who, prior to joining Hewitt-Robins, was assistant general foreman of the primary and secondary crushing sections in the ore dressing department of Erie Mining Company.

PAUL J. REEVES has been promoted from director of sales to vice-president in charge of sales for The Timken Roller Bearing Company, Canton, Ohio. He succeeds W. B. Moore, who has retired.

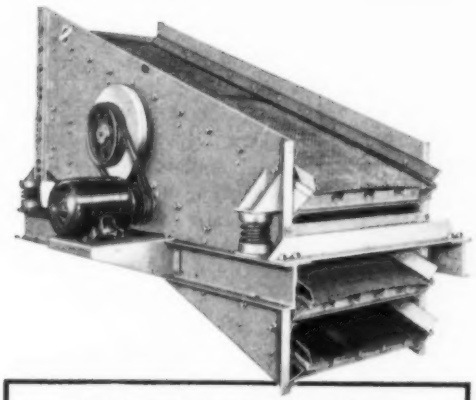
To fill vacancies created by this promotion, four executive changes have been made within the Sales Division. ROBERT G. WINGERTER was named director of sales, S. T. SALVAGE became general manager of the Automotive Division, NORMAN H. PETERSON was made advertising manager, and W. RODERIC COVEY became assistant advertising manager.

Newly-appointed general sales manager of the Sutorbilt Corporation, Compton, Calif., is HENRY S. WARREN, who was formerly sales promotion manager of the Stoody Company, Whittier, Calif.

ANOTHER NEW SLIDE RULE

FREE!

gives you VIBRATING SCREEN CAPACITIES



Another Telsmith first—a handy, compact slide rule with all the factors needed to determine the capacity of any vibrating screen. It takes into consideration—(1) the kind of material to be screened; (2) size of screen openings; (3) percentage of oversize in the feed; (4) percentage of feed less than one-half size of screen openings; (5) whether top, second, or third deck; (6) shape of screen openings; and (7) screen slope. This slide rule gives you, in a few seconds, tons per hour per square foot through screen cloth and capacity of any size of screen. It will help you to pick and buy the most economical size of vibrating screens for your plant or mill.

HOW TO GET YOUR FREE SLIDE RULE

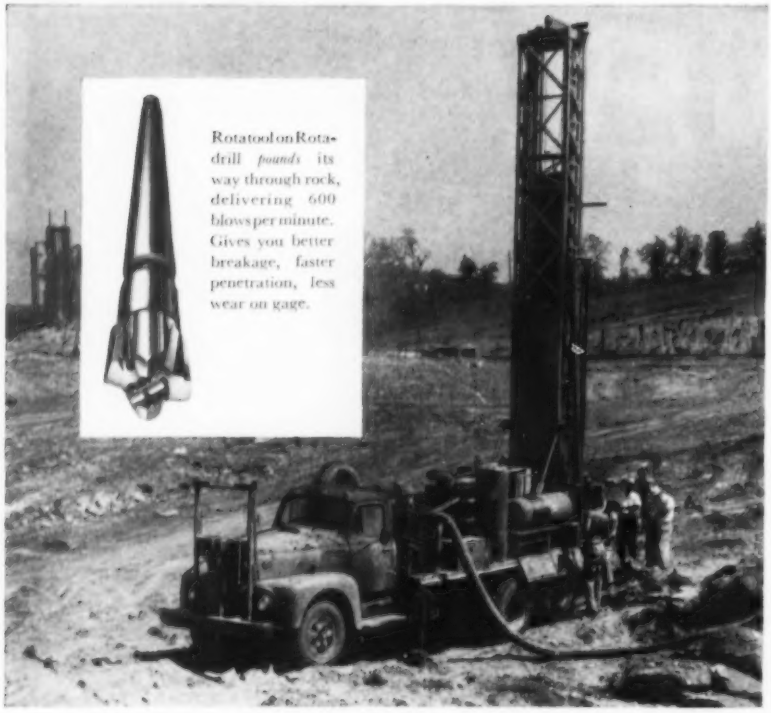
A request for a **Vibrating Screen** Slide Rule addressed to Smith Engineering Works, Milwaukee 1, Wis., on your letterhead, stating your position, will bring you one with Telsmith's compliments.

SRV-559

SMITH ENGINEERING WORKS

504 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • **Cable Address: Songworks, Milwaukee**


Rotatool on Rotadrill *pounds* its way through rock, delivering 600 blows per minute. Gives you better breakage, faster penetration, less wear on gage.

That's the sweet sound of profit banging in your ears!

It's the hammering of a Schramm Rotatool at work. Add the rotary action of a Schramm Rotadrill and you have the sweet sound of profit as the fastest, most efficient drilling rig ever made pounds away at drilling costs. Rock is broken and shattered simultaneously—large chips are instantly removed by rapidly flowing air to maintain drilling contact with new, solid rock. Just compare these drilling rates: churn drilling in hard rock averages 3.5′ per hour; Schramm Rotadrill with tri-cone bit, 22′ to 24′ per hour; Rotadrill with Rotatool, an amazing 30′ to 35′ per hour.

Rotadrill with Rotatool gives you the advantages of . . .

Faster Penetration Heavier hammer delivers more crushing energy per blow for better breakage, faster drilling rates.

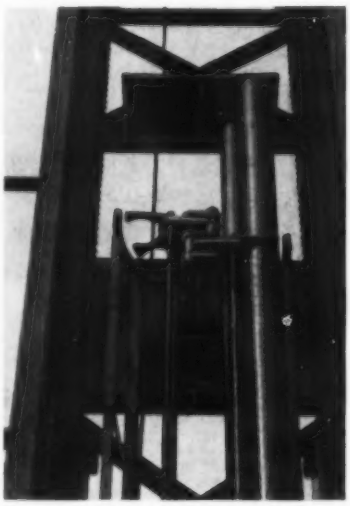
Full Force at Tool All the power is at bottom of the hole—none lost through drill pipe.

Instant Impact is delivered to the bit for greater power—makes fast, deep holes where many drills are stopped.

Straighter, Cleaner Holes.

In quarry operations, speed means profit. Rotadrill has it! Learn all of Rotadrill's advantages from your local Schramm Dealer, or write today for your copy of Bulletin TRD-56.

See the Yellow Pages for local Sales, Service and Rental of Schramm Rotadrills—Truck, Pneumatractor, "Do-it-yourself."



"Lazy Susan" pipe-rack holder makes steel changes faster, safer, than ever. Device holds four lengths of pipe, swings into position under rotation head-sub to easily add or remove pipe. No "jockeying" of pipe. No lost time.

Actual Drilling Rates in Pennsylvania Hard Rock	
Churn Drill	3.5′ per hour
Competitive Rotary Drill	20′—27′ per hour
Schramm Rotadrill with Tri-cone Bit	22′—24′ per hour
Schramm Rotadrill with Rotatool	30′—35′ per hour

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

640 North Garfield Ave. • West Chester, Pa.

Enter 164 on card, page 155

E. A. Thoma

A. G. Neumayer

Two new appointments have been announced by Syntron Company, Homer City, Pa. EDWARD A. THOMA is now vibratory feeder sales engineer. His responsibilities include sales engineering of the company's line of electromagnetic vibrating bulk material feeders, feeding equipment, flow control valves and hopper level switches for handling or processing bulk materials. Mr. Thoma will relocate to Indiana, Pa.

ALBERT G. NEUMAYER has been appointed to the position of vibrating screen sales engineer. His responsibilities include sales engineering of the company's line of vibrating screens and screening-feeding equipment for handling or processing bulk materials.

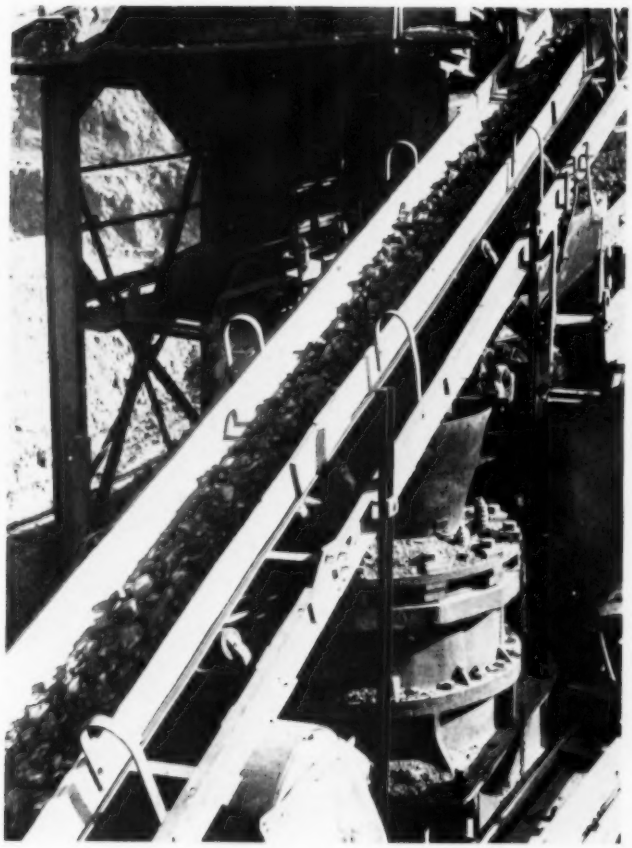
An award for excellence in non-theatrical films has been awarded to Hercules Powder Company, Wilmington, Del., for its entry in the Annual American Film Festival in New York City. Hercules' 16 mm. color film, *Blasting Vibrations—Cause and Effect*, was given the Blue Ribbon Award in the sales and technical training category.

HUGH I. HUNT has been promoted to truck tire sales manager for the Cincinnati Division of The General Tire & Rubber Company, Akron, Ohio. Associated with General since 1956, Mr. Hunt has had considerable previous experience in sales work. In his previous assignment with the company, he was Worcester, Mass., territory salesman out of the Boston division.

In his new position, he will headquarter at Cincinnati and direct sales of General's truck tire in portions of Ohio, Kentucky, Indiana, and West Virginia.

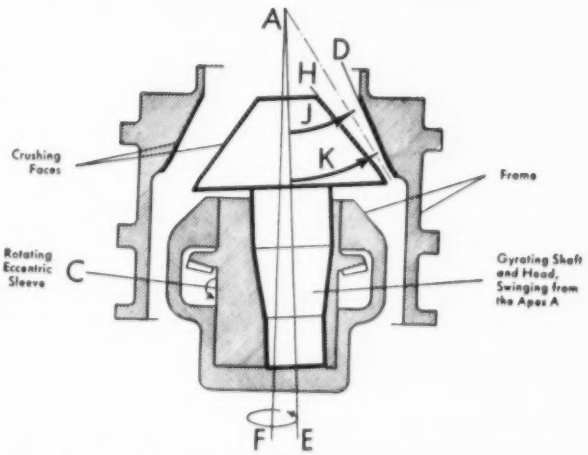
(*Continued on page* 169)

Plant output increased 17% with KUE-KEN® GYRATORY CRUSHER



To eliminate the 8 hour loss out of every 48 in downtime for building up rolls, Gallagher & Burk, Oakland, California, switched to Kue-Ken gyratory for secondary crushing and has operated for over a year with but a single replacement of the liner as the only maintenance. Crushing at the rate of 100 to 200 tons of hard rock per hour, Kue-Ken handled over 40,000 tons on the original liner. With Kue-Ken's patented "crushing without rubbing", rock is crushed squarely without the upward abrasive action that quickly wears out liners in ordinary crushers. Compact in size and taking choke feed, Kue-Ken makes economical gyratory crushing practical in flow sheets where headroom is limited. Though exceedingly strong, Kue-Ken weighs less yet has larger shaft and bearings. For permanent or portable installation.

WRITE FOR CATALOG



See how Kue-Ken crushing faces pass through crushing zone on arcs J and K to crush rock squarely without rubbing liners.

KUE-KEN® CRUSHERS

"Crushing without Rubbing"

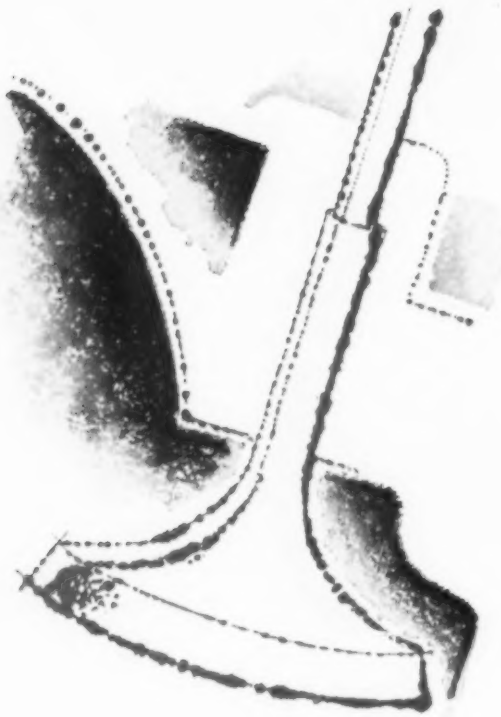
STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens
Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

DEALERS:

SEATTLE, WASH.	Washington Machinery Co.
VANCOUVER, B. C.	Universal Equipment Co.
SALT LAKE CITY, UTAH	Lund Machinery Co.
SAN ANTONIO, TEX.	Closner Equipment Co.
LOS ANGELES, CALIF.	Garlinghouse, Fremon Co.
SAN FRANCISCO, CALIF.	Aggregates Engineers, Inc.
BISMARCK, NORTH DAKOTA	Midwest Equipment Co.
PHOENIX, ARIZ.	Road Machinery Co.

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

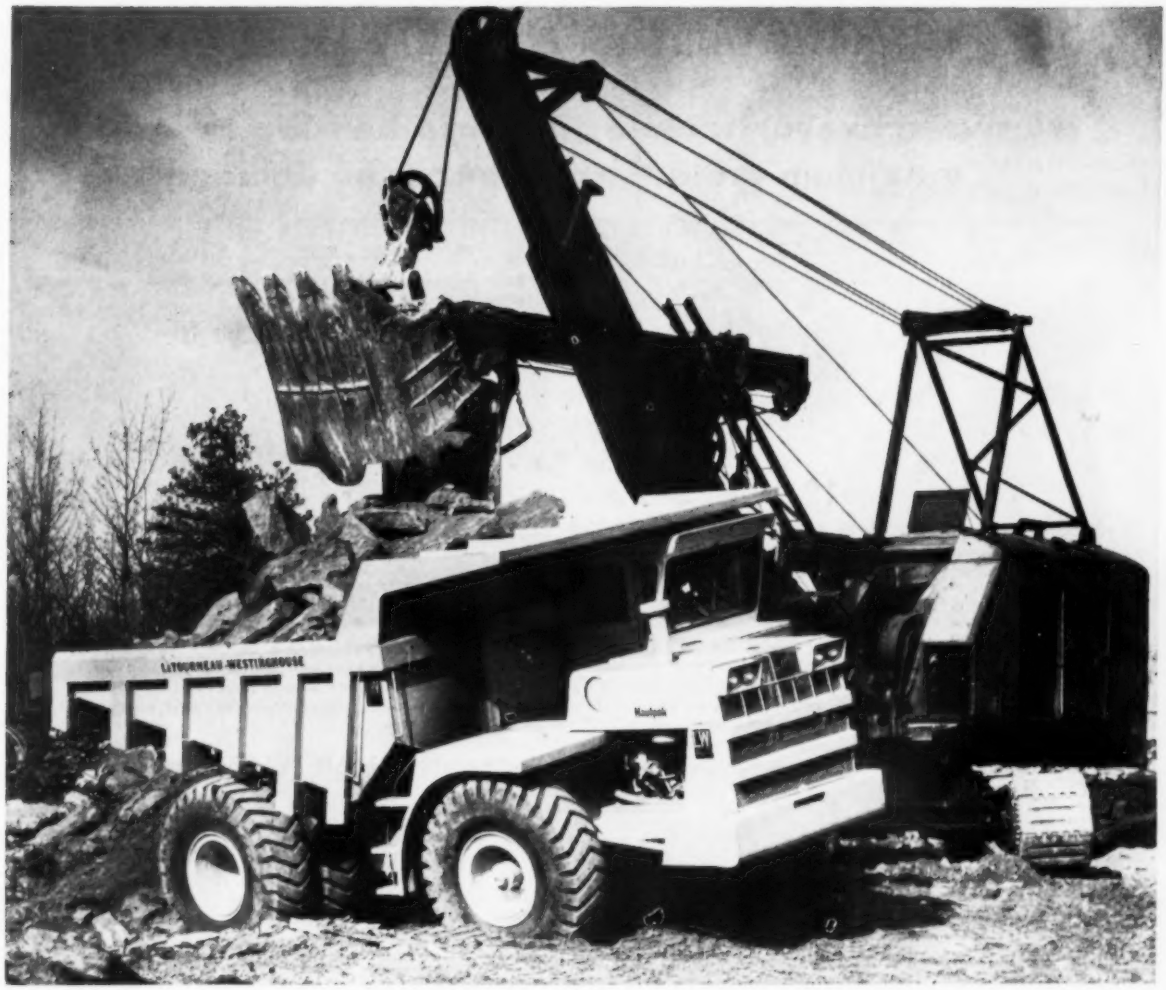


Valves... Oil... and How to Save Money

Valves which open and close hundreds of times a minute can cause lost money, time and power when deposits and wear start to take their toll. Sinclair Tenol® Oils fight deposits and wear—help keep vital parts working longer without repair. Refill with Tenol now. Next time management asks how you've cut costs, tell them you've switched to Sinclair—and show them the results.

Call your Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation.

Sinclair Tenol® Oils



JOB RECORDS PROVE

Firestones lower tire costs-per-hour!

Firestone off-the-highway tires cut costs by working extra hours on the roughest jobs! That's because they're built with Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires. Tough Firestone treads and sidewalls defy cuts from rubble and shale. Exclusive Firestone S/F (Shock-Fortified) nylon bodies shrug off bruising shock and impact. There's a Firestone tread and tire design that is job-engineered for your job requirements. Call your Firestone Dealer or Store and ask about Firestone's full line of tubeless or tubed off-the-highway tires and on-the-job tire service.

Rock Grip Excavator Wide Base — Rock Grip Excavator

When ordering new equipment always specify Firestone tires—available tubeless or tubed.

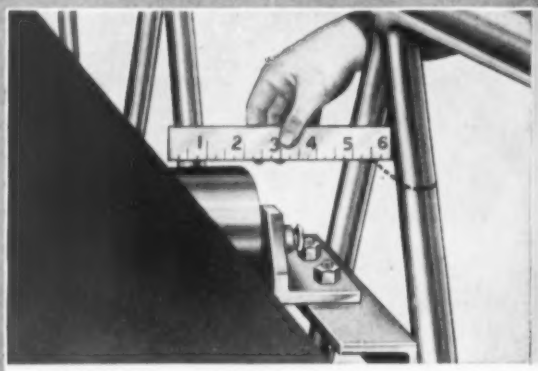
Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1959, The Firestone Tire & Rubber Company

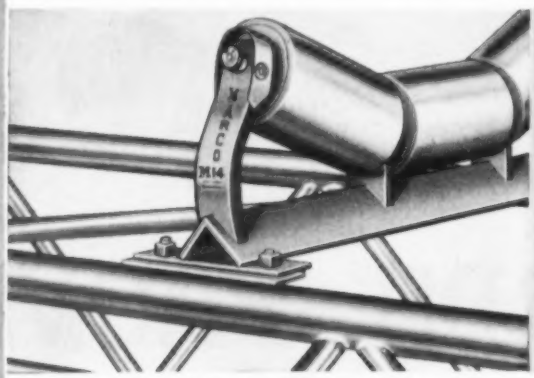
REDUCE BELT COSTS WITH MARCO TUBULAR FRAME CONVEYORS

Exclusive conveyor features increase belt life by offering maximum protection against edge damage

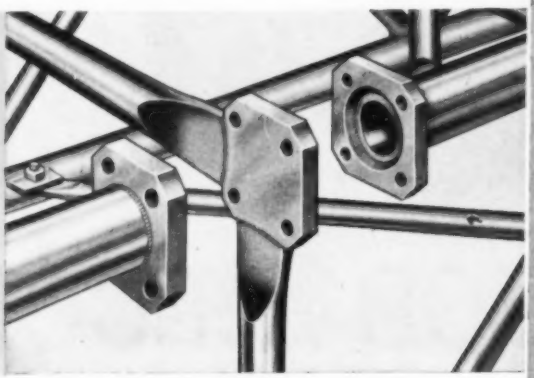


WIDER FRAME—MARCO Tubular Frames are widest in the industry. They provide 100% more space (5½") in the critical area—between belt edge and nearest frame member. Pedestal type return idler brackets are used, instead of hanger brackets that confine and damage belt.

WIDER FACE PULLEYS—MARCO is first with modern pulley specifications. 2" between belt and pulley edge—provides 100% greater protection than outmoded standards. Reduces possibility of belt destruction caused by "belt wandering" in high tension areas.



ALL TUBULAR MEMBERS—MARCO Tubular Frames are more rigid. Constructed of the strongest known structural member, these frames are modern—and resist material and water build-up. Sharp "belt cutting" edges are eliminated with this exclusive construction.



RIGID JOINT CONSTRUCTION—Another MARCO exclusive—4 bolts in each connection—16 in each joint. Not the usual 1 or 2 per connection. Joints are more rigid. Resists frame misalignment, simplifying belt training and increasing belt life.

Now, more than ever, conveyor belt represents the largest major repair or replacement expense in a conveyor installation. Realizing the extreme importance of this fact, MARCO has designed every conceivable belt saving idea into its Tubular Frame Conveyors.

MARCO is first to have all 4 of these proven belt protection features: a wider frame, wider face pulleys, all tubular members and the most rigid joint construction.

If wind, uneven loading, or factors beyond control should cause "belt-wandering", this exclusive conveyor design offers the operator the finest, most complete protection against belt "edge damage".

Increasing belt life by reducing belt "edge damage" is only one of the cost saving advantages in MARCO Tubular Frame Conveyors. Remember, your conveyors are not mere plant accessories—they deserve the attention of a specialized manufacturer offering modern specifications, carefully and properly designed to meet your most exacting requirements. For more information consult your MARCO Distributor or contact E. F. Marsh Engineering Co., St. Louis 10, Missouri.

MARCO® engineered MARCO products:

Tubular Frame Belt Conveyors · Conveyor Idlers · Solid and Self Cleaning Steel Pulleys
Bucket Elevators · Control Gates · Feeders · Bins

®Trademark Reg.

Manufacturers' News

(*From page* 164)

The Construction Machinery Division of Clark Equipment Company located at Benton Harbor, Mich., has announced a new territorial line-up for its district representatives in the western portion of the United States.

JOHN A. HALLERAN, formerly a *Michigan* special field representative in the northwestern United States, is now a district representa-

J. A. Halleran

J. A. Allsup

tive with the territory of Alaska, Washington, Oregon, and Idaho.

JOHN A. ALLSUP, formerly a *Michigan* special field representative in the Plain States area, is now a district representative with the territory of Montana, Wyoming, Utah, New Mexico, and the El Paso section of Texas.

CLARENCE E. ZERMER covers northern California and Nevada. D. W. PEDLEY will now service southern California, Arizona, and Hawaii. M. J. HARRISON now handles Texas (except for the El Paso area) and Oklahoma.

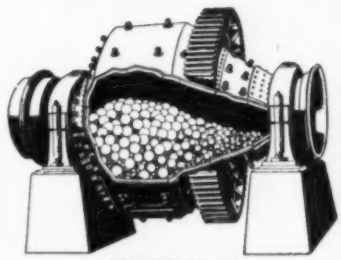
Three new appointments in the field sales organization of the Dodge Manufacturing Corporation, Mishawaka, Ind., have been announced.

PAUL KEB, sales representative in Charlotte, N. C., for the last ten years, becomes district manager for North and South Carolina, succeeding George Woolley, of Charlotte, who retires after representing Dodge for 25 years in that territory.

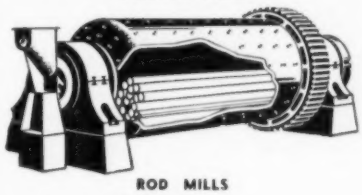
JACK STROOBANDT will become sales representative in the same territory, assisting Mr. Keb. He has been with Dodge since 1956.

CHARLES CURTIS has been assigned to the New York district office of Dodge in New York City, where he will handle sales in parts of Connecticut, Massachusetts, and New York.

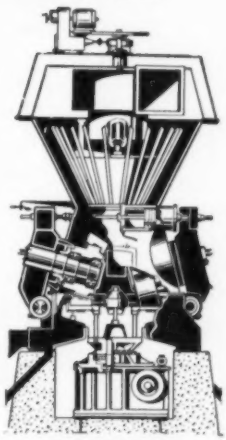
GRINDING AND PULVERIZING



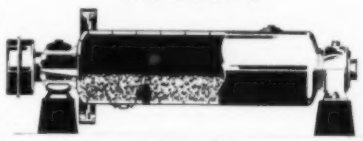
CONICAL MILLS



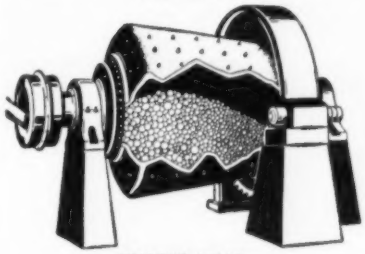
ROD MILLS



DISC-ROLL MILLS



TUBE MILLS



TRICONE MILLS

No matter what your grinding problem — coarse or fine grind — hard or soft material — Hardinge has a mill for the job. Check the applications of the different Hardinge Mills below:

CONICAL MILLS

The shape of the Hardinge Conical Mill causes a rapid circulating and classifying action within the drum, which increases the capacity for power expended over other types. The range of grinding is large, due to the segregation of the sizes within the mill. Sizes range from 2 feet to 10 feet with capacities from a few pounds per hour to 100 tons per hour. Bulletin 17-C-8 gives dry grinding applications; Bulletin AH-389-8 wet grinding.

ROD MILLS

Steel rods are employed as grinding media. Ideal for producing minimum oversize in open circuit grinding. Conical heads reduce friction, prevent congestion of charge at the ends, and align the rods. Available with either end, or center, peripheral discharge, as well as trunnion overflow. Bulletin 25-C-8.

DISC-ROLL MILLS

An adaptation of the German "Loesche Mill." A roller-mill with rotating grinding table and pneumatically-loaded rolls for complete flexibility of operation. The "Gyrotor" Classifier, combined with the Disc-Roll Mill, provides a highly-efficient dry-grinding device, ideal for relatively soft minerals. Bulletin 52-8.

TUBE MILLS

For a fine product in open circuit without the use of classifiers. For mixing and grinding to secure a smooth texture or plastic product. Bulletin 18-A-8.

TRICONE MILLS

Built in the same principle as the Conical Mill, the Tricone Mill offers greater grinding volume for a given amount of floor space than any other tumbling mill built. Extremely efficient. Ideal for large tonnages. Sizes up to 12 ft. diameter. Bulletin AH-414-8.

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 ARCH ST. • Main Office and Works

New York · Toronto · Chicago · Hibbing · Houston · Salt Lake City · San Francisco · Birmingham · Jacksonville Beach

Enter 169 on card, page 155

Special awards are presented to four distributors, two from Canada, and two from the United States. Pictured from left to right, are T. M. Deal Jr., Square Deal Machinery of Orlando, Fla.; D. C. Campbell of Tractors and Equipment Ltd., Fredericton, New Brunswick, Canada; T. M. Deal Sr.; D. W. Lehti, president of Link-Belt Speeder; Paul Taylor of Mid-Continent Equipment Co., Sioux City, Iowa; George E. Bernard of Laurion Equipment Ltd., Montreal and Quebec City, and C. M. Basile, vice-president of Link-Belt Speeder.

Link-Belt Speeder Corporation, Cedar Rapids, Iowa, held a special marketing conference and a new product premiere on April 7-8. The program was attended by 150 distributor management men from all parts of the United States, Canada, and Mexico.

A chartered flight carried about 70 of the men from Chicago to the Link-Belt Speeder plant at Cedar Rapids, Iowa, and returned them to Chicago at the termination of the two-day session.

Preceding Wednesday's full schedule, a dinner meeting, complete with speeches, awards, and entertainment, was given. Hosting the occasion were the Link-Belt Speeder officers and management group. Also in attendance were executive officers of the parent organization, Link-Belt Company, Chicago, Ill. These included R. C. Becherer, president; H. L. Hoefman, vice-president of manufacturing; D. E. Davidson, vice-president of sales, and H. W. Aden, treasurer.

At the dinner, four special awards were given to distributors for achievement in the two categories of top dollar volume and best performances in terms of market penetration.

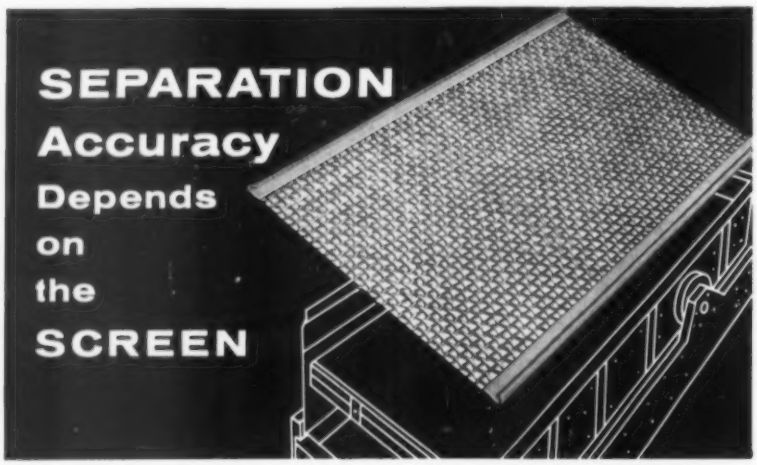
Square Deal Machinery of Orlando, Fla., and Laurion Equipment Ltd. of Montreal and Quebec City, Que., were tops in dollar volume in the United States and Canada. Receiving the placques for achievement in the second category were Mid-Continent Equipment Company, Sioux City, Iowa; and Equipment Ltd. of Fredericton, N. B.

On Wednesday morning the distributors toured the plant. This was followed by a "Parade of Products". A new ¾-cu. yd. shovel-crane, the LS-78 was introduced. Demonstrations were given by several new models such as the 35- and 40-ton truck cranes. Among the other pieces of equipment reviewed were the 15-ton self-propelled UC-68 and the three diesel pile hammer models, rated from 7,500 ft.-lbs. up to 30,000 ft.-lbs.

Concluding the second day was a business meeting primarily devoted to the presentation of shovel-crane marketing, covering such factors as sales service training and practice, advertising, and promotion.

JOSEPH L. BUNKER has been promoted to manager of truck tire sales for the Los Angeles division of The General Tire & Rubber Company, Akron, Ohio.

Mr. Bunker joined General Tire in 1955 as Los Angeles territory salesman. He was named top territory salesman of the year for obtaining the greatest amount of new business during 1958.



● Accurate separation of any vibrating equipment depends upon the screen. High tonnage, reduced blindness and extra strength are a result of careful screen selection. Cleveland's years of manufacturing experience provide a wide range of accurately sized weaves for long, trouble-free life. Available in Cleloy and all commercial metals for all types of mechanical and electrical vibrating equipment. Exclusive hooked edge design reduces bending, slipping and screen distortion.

See our ad in PIT & QUARRY Yearbook

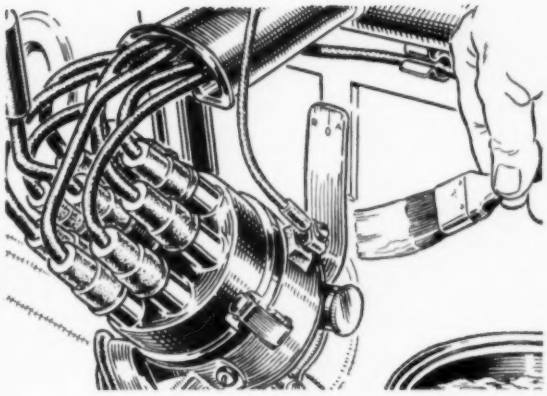
Send specifications today. Ask for a free copy of our vibrating screen bulletin.

THE CLEVELAND WIRE CLOTH & MFG. CO.
3574 East 78th Street • Cleveland 5, Ohio • Telephone: Diamond 1-1832

Enter 170 on card, page 155

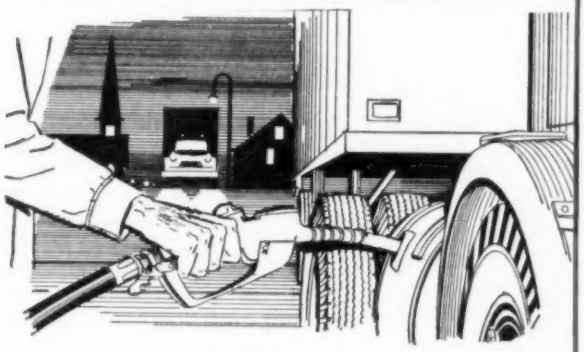
LUBE LOGIC

These sure-money "SLEEPERS" can stop the clock on maintenance time



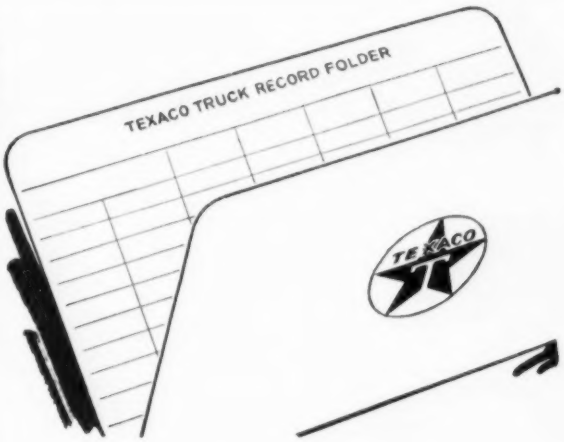
WATERPROOFED IGNITION MAKES STARTING EASIER

Are your batteries showing the strain of a heavy foot on the starter on damp days? Get your TAE* to show you how to waterproof ignitions with Texaco Rust-proof L. It's a simple, five minute job that pays off with months of faster starts.



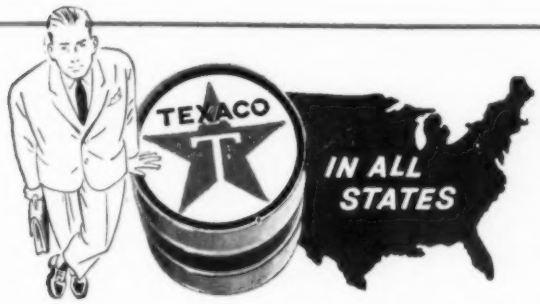
HOW TO KEEP CONDENSATION OUT OF YOUR TANK

Condensation in your fuel tank can make even the best gasoline sound like you were robbed. One way to avoid it is to fill your tank in the evening—when it's cool and the gas has contracted to minimum volume—and *keep* it filled overnight. This cuts down the possibility of condensation by reducing air volume.



TRUCK RECORD FOLDER

Sturdy manila folders designed to help you keep tabs on mileage, oil changes, lubrication, tire life, batteries, etc., is yours for the asking. Tell your TAE* how many you need: or write direct.



*TEXACO AUTOMOTIVE ENGINEERS

Every month or so we'll bring you a batch of "sleepers"—little angles, so easy to overlook, where big savings in time and money can be made. But month in, month out, your local Texaco Automotive Engineer is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd St., New York 17, N. Y. Dept. PQ-10.

Huber-Warco Company, Marion, Ohio, announces the appointment of the Fred Greenley Machinery Company as a distributor. Greenley Machinery, located in Forty Fort, Pa., will cover the northeast section of Pennsylvania.

C. A. PICKETT has been elected manager of the Merchandise Division of American Air Filter Company, Inc., Louisville, Ky. He formerly served as manager of the Field Sales Administration for AAF.

J. ALLAN MACLEAN has been elected president of Dodge Manufacturing Corporation, Mishawaka, Ind., succeeding JOSEPH E. OTIS JR., who has been elected chairman of the board of directors.

Mr. MacLean, group executive and general manager of Bendix Products Division, Bendix Aviation Corporation, has been a member of the Dodge board since 1956.

Mr. Otis became president in 1939, when he came to Dodge from the presidency of Stewart-Warner Corporation.

H. J. LEWINSKI is now Central Zone manager for the Daybrook Hydraulic Division, Young Spring & Wire Corporation, Bowling Green, Ohio.

The Central Zone includes the states of Illinois, Wisconsin, Michigan, Indiana, and Ohio. The new manager will work with Daybrook truck equipment distributors, assisting in the merchandising and service of dump bodies and hoists, and related truck equipment.

H. J. Lewinski

L. B. Philippi

L. B. PHILIPPI has been named to head a new Truck Sales Division being established by the LeTourneau-Westinghouse Company, Peoria, Ill.

As sales manager—Truck Division, Mr. Philippi will direct worldwide merchandising activities of the new Haulpak line of end-dump and bottom-dump trucks. He will coordinate his sales activities through the company's existing domestic, export, and government divisions.

Mr. Philippi comes to L-W from the Autocar Division, White Motor Company, where he was sales manager of the Off-road Truck Division for the last three years.

At a recent board meeting, directors of the Macwhyte Company, Kenosha, Wis., reappointed the following officers: George C. Wilder, president; E. C. Berg, vice-president and controller; F. D. Holden, vice-president in charge of sales; Goodwin Johnston, secretary-treasurer.

HAROLD R. WARSMITH has been named factory manager at The Jeffrey Manufacturing Company, Columbus, Ohio. He was formerly general superintendent. Succeeding Mr. Warsmith as general superintendent is John R. Simon, formerly Machine Division superintendent.

MADSEN Equipment that Serves.

Easy to set up and a honey to operate

We like the portability and quick-erection features... the fast-mixing action and the clean operation of our Madsen Asphalt Plant — *says Gene Ballard, Vice President, East Coast Asphalt Corp., Fort Lauderdale, Florida*

Owners of MADSEN Asphalt Plants may not agree on which MADSEN feature is most outstanding, but, they all agree that MADSEN gives them the right combination of advanced engineering features for a more profitable asphalt plant operation. The MADSEN Model 481 Asphalt Plant, for example, offers more than 25 big features and advantages that increase production, reduce maintenance, and save countless dollars in plant operation. Some of these features are shown below. See your MADSEN Distributor for the complete story.

MADSEN
ASPHALT PLANTS

Built in sizes of 1000-lbs. to 6000-lbs. batch capacity

The big MADSEN 5000-lb. Model 481 batch capacity asphalt plant shown above is owned and operated by East Coast Asphalt Corporation of Fort Lauderdale, Florida. It has a 50-ton, 4-compartment hot bin, an 84" x 36' Madsen Dryer, a Madsen 12' diam. Cyclone Dust Collector and a Madsen Triple Wet Tube Dust Washer.

This plant is capable of producing up to 200 T.P.H. on a 45-second charge-mix discharge cycle.

FEWER SEPARATE PARTS MEAN FASTER ERECTION — Complete box-like unit sections are built for transport on the highways. All major components may be wheel-equipped at the factory or in the field.

FAST, PRECISION TIMING AND WEIGHING

MADSEN Twin-Shaft PUG MILL MIXERS — Combined with Madsen Asphalt Pressure Injection System (Patented) to provide the fastest and most thorough mixing action known to the industry.

ROLL-AWAY WEIGH-BOX — Exposes mixer for fast, easy servicing of mixer tips and shanks.

CLEANEST OPERATION — Madsen Asphalt Plants meet air pollution requirements everywhere. Tests prove Madsen Triple Wet Tube Dust Washers are 99.7% efficient!

Ask your MADSEN Distributor for Catalog No. 800-A or write MADSEN WORKS

MADSEN maintains a complete parts stock in Los Angeles and Lima, Ohio

MADSEN WORKS / BALDWIN-LIMA-HAMILTON Construction Equipment Division

14120 E. ROSECRANS AVE., P.O. BOX 38, LA MIRADA, CALIFORNIA
BALDWIN-LIMA-HAMILTON CORPORATION, LIMA, OHIO

Enter 172 on card, page 155

Speed up that job with a JOHN DEERE CRAWLER-LOADER

Here's why you get efficient work and top handling ease with a John Deere Crawler-Loader. After bucket is dumped at full height position, operator can return it to digging angle by use of boom-control only. And there's no need to shift gears to back away from the truck and head for the spoilheap—the clutch-type direction reverser takes care of that. Clutch-control steering adds to the unit's unmatched maneuverability.

Both Diesel and gasoline units are available, each with a new heavy-duty transmission and new working speeds to give you most efficient use of this low-cost power.

See your John Deere Industrial dealer for a demonstration —discover for yourself why this loader gives you top work-capacity per dollar.

Basic Facts on the 831 Loader

Bucket Capacity	7/8 Yard, Heaped
Roll-Back	35 Degrees
Pry-Out Pressure	8500 Pounds
Dumping Clearance	7 Feet, 10 Inches
Dumping Angle at Full Height	50 Degrees
Engine Options	Gasoline or Diesel

More facts? Write: John Deere Industrial Division, Dept. 543, Moline, Ill.

JOHN DEERE "Specialists in Low-Cost Power with a Heavyweight Punch"

CHARLES M. MAYHEW has been elected a director of Gardner-Denver Company, Quincy, Ill.

Mr. Mayhew is vice-president of the Mayhew Machine and Mayhew Supply Companies, Dallas, Tex., which joined the Gardner-Denver group in 1958.

Re-elected at the annual meeting were Ralph G. Gardner, chairman, Arthur D. Chilgren, E. Vincent Erickson, Benjamin C. Essig, John W. Gardner, Arthur E. Johnson, Gifford V. Leece, Alexander G. Linquist, and B. P. Sherwood Jr.

Raymond Bag Corporation, Middletown, Ohio, has appointed HOWARD LUNDEEN quality control supervisor in charge of all quality control operations in the firm's plants at Middletown and at Richmond, Va.

Bailey Meter Company has opened a New Jersey sales office at East Orange. This new sales office is under the direction of H. C. WHEATON, who managed the company's New York district office.

G. L. BEGO and R. W. FRANCK have been promoted to new positions with the Cummins Engine Company, Inc., Columbus, Ind.

Mr. Bego has been named director of sales services and is responsible for directing all activities of the Sales Development Department and Cummins Diesel Sales Corporation. Previously, he was manager of Cummins Diesel Sales Corporation, a wholly-owned subsidiary.

Mr. Franck has been appointed Cummins' new field sales manager, and is responsible for fleet sales activities and Cummins' Regional Offices. He joined the Company in 1948 and was manager - sales development prior to his new appointment.

ADOLPH A. KARRASCH, veteran truck engine production man for the International Harvester Company, has been appointed director of manufacturing of the Hercules Motors Corporation, Canton, Ohio.

For the last year, Mr. Karrasch has been assistant works manager of International Harvester's Motor Truck Plant at Fort Wayne, Ind. During his 22 years with IHC, he has served as general superintendent at the Indianapolis Works and in various positions in the Milwaukee, St. Paul, Chicago, and Louisville plants.

JAMES F. PORTER has been named chief engineer for the Chase Bag Company, New York, N. Y., Mr. Porter, formerly manager of the firm's manufacturing plant in Toledo, Ohio, will be succeeded in that position by JAMES E. TOWN JR.

Mr. Town has held administrative positions at Chase branches in Chagrin Falls, Ohio, Crossett, Ark., and Toledo since joining the company in 1952.

Mussens Canada Limited, Montreal, Que., has been appointed a distributor for the Bucyrus-Erie Company, South Milwaukee, Wis., and for the Bucyrus-Erie Company of Canada, Ltd., Guelph, Ont. The new distributor's territory includes the provinces of Quebec, New Brunswick, and Nova Scotia, and also Prince Edward Island.

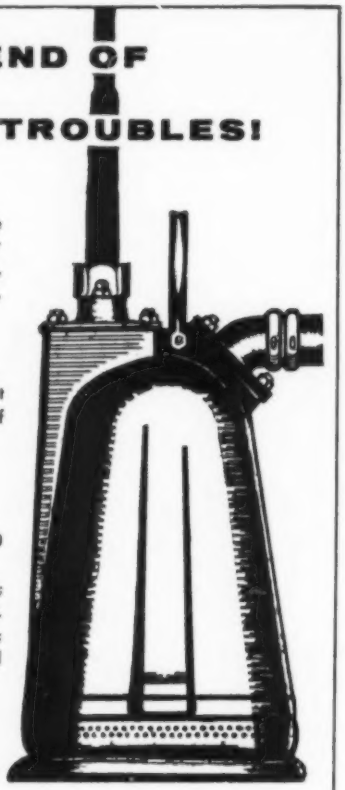
THIS IS THE END OF YOUR WATER TROUBLES!

FLYGT electric pumps work round the clock with practically no supervision or maintenance. They are fully portable, fully submersible — need no priming, no installation.

FLYGT pumps can run dry without damage — take a high proportion of solids without clogging.

Other **FLYGT** pumps:
B-80L: 3" hose; 6 hp; 185 lbs; 330 GPM; max. head 170 ft.
B-80M: only 9" diameter; 3" hose; 6 hp; 140 lbs; 300 GPM; max. head 115 ft.
B-150/200L: 6" or 8" hose; 65 hp; 1,200 lbs; 3,000 GPM; max. head 220 ft.

HIGHER HEADS WITH **FLYGT** PUMPS IN TANDEM.



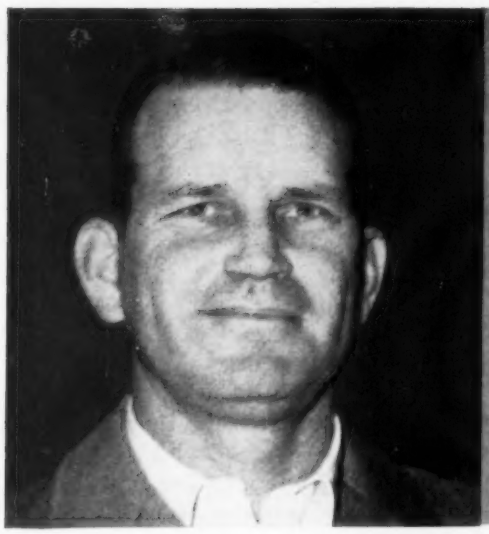
B-38L data: 1½"hose; 1.8 hp; 79 lbs; 75 GPM; max. head 90 ft.

FLYGT

WEST OF THE MISSISSIPPI:
Stancs MFGS. & SALES INC
1666 Ninth St.
(Corner of Olympic & Ninth)
Santa Monica, California.

EAST OF THE MISSISSIPPI:
STENBERG MANUFACTURING CORPORATION
Hoosick Falls, N.Y.

Enter 174 on card, page 155



"1,000,000 cubic yards over our SECO SCREEN..."

Says Mr. Guy Young, General Superintendent, Collins Construction Company of Texas, Midland, Texas.

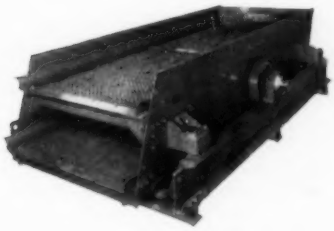
"and not ONE mechanical failure"

"Our SECO Screen has been producing with our portable crushing plant for two years now. As the primary scalper screen, this 5′ x 10′, double deck unit handles an average of 16 cubic yards of limestone rock per minute."

It's on-the-job performance like this that makes SECO's "years ahead" engineering pay off for you. Every SECO Vibrating Screen is designed for years of long, hard usage at maximum efficiency.

No matter how rough the job or how tough the specifications, there's a SECO Screen to meet your most exacting requirements with trouble-free operation.

Send for SECO 4-bearing Screen Catalog #204 or 2-bearing Booklet TB-21



Mr. Jack Graham, Crusher Foreman Collins Construction Company of Texas

SECO

VIBRATING SCREENS

SCREEN EQUIPMENT CO., Inc.

Buffalo 25, N. Y.

engine power BY CATERPILLAR

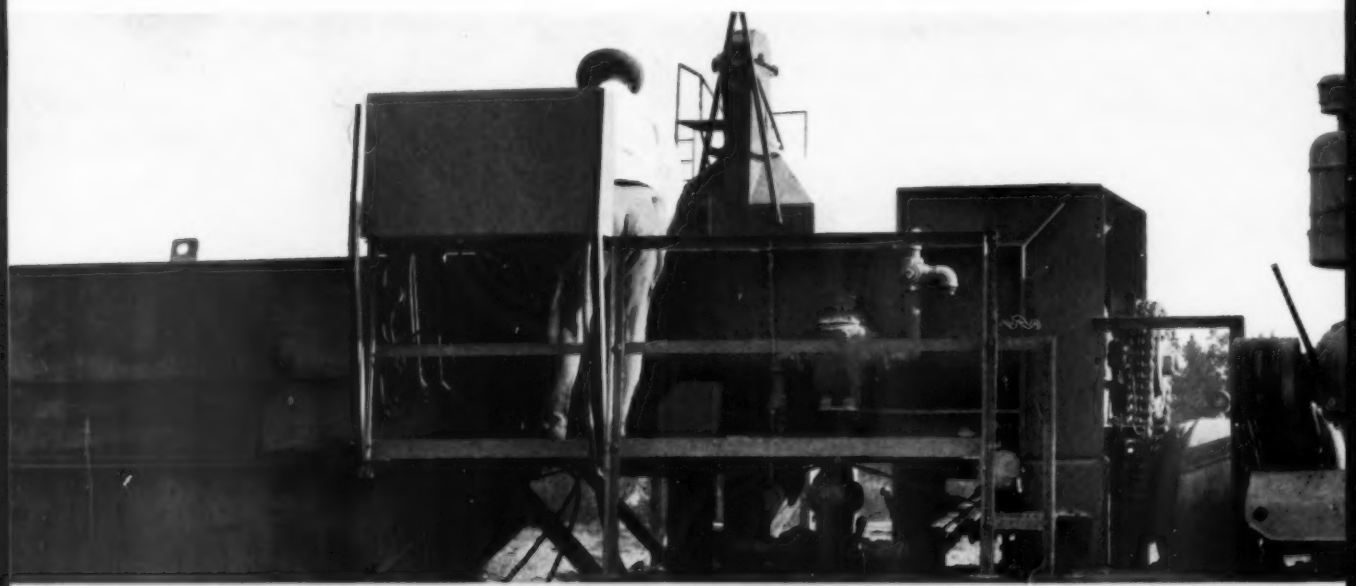
CAT "TWO-HANDED" OF BASE

. . . supplies *portable* power for *both* mechanical and electrical equipment

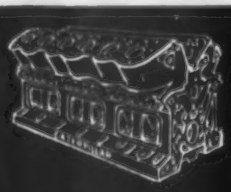
In Wyoming, where a lot of base stabilization must be done in highway construction, Wyoming Paving Company was awarded a late season paving contract where maximum plant production was a must.

Wyoming Paving Company solved their power problem—and their production problem too—with a Cat D337 Series F "Two-Handed" Engine. This Cat unit provides direct mechanical drive, through a clutch, on one end of the diesel engine shaft. Simultaneously, an electrical generator on the other end is capable of handling up to 60 KW of 240-volt, 60-cycle, 3-phase electrical load. Total rated output of the unit is 230 BHP.

With this ample power, Wyoming Paving Company has been able to double the manufacturer's minimum plant production and produce 550 tons of material an hour—occasionally as much as 600 tons. The compact Caterpillar unit has helped them speed construction of an important section of Interstate Highway 25 in Wyoming—and it gives them convenient, portable power for their



Caterpillar's own foundry casts engine blocks of a special high-tensile-strength alloy, 50% stronger than ordinary gray iron castings. Further rigidity and strength are provided by numerous ribs and partitions.



Cat Generators have outstanding heavy motor starting ability, are simple and compact with no moving parts in the voltage control system. Output terminals are conveniently located for connection to panel or load. Generators are *matched* to engines.

Your Caterpillar Dealer Engine Specialist is your diesel power consultant. He's backed by quality parts reasonably priced, and a skilled staff of factory-trained servicemen. Call him now to avoid problems later.

CDES

Enter 176 on card, page 155

ENGINE DOUBLES USUAL OUTPUT STABILIZATION PLANT

crusher and hot plant or for lighting when the unit is not needed for base stabilization.

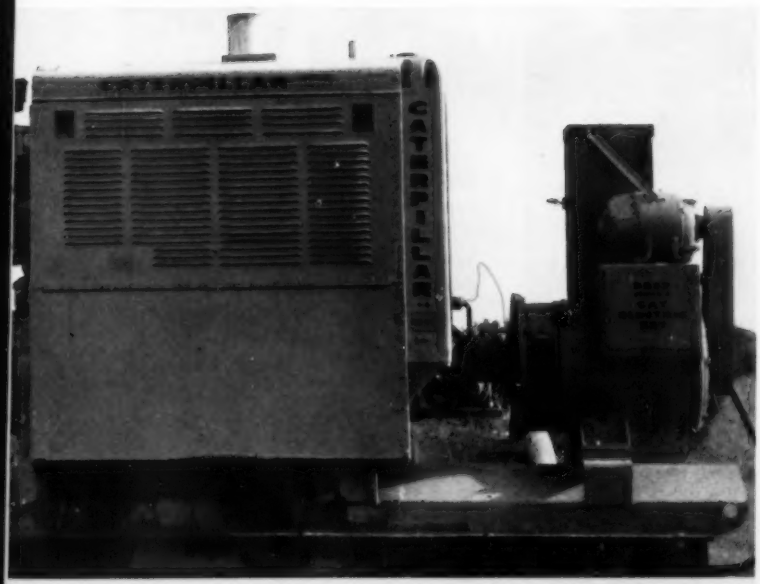
The D337 Series F is just one of *nine* basic Cat Engines. Capacities range from 75 to 700 horsepower. This line of versatile Cat Engines saves space, gives you portable power for every purpose, and saves money where you need both mechanical and electrical power.

Your Caterpillar Dealer Engine Specialist can help you choose the best size and type for diesel power, generator or combination drive applications. He can help you with *any* problem or question you have concerning diesel power. Call him for repowering assistance or for advice in selecting the proper engine for new plants, excavators, dredges, compressors or locomotives.

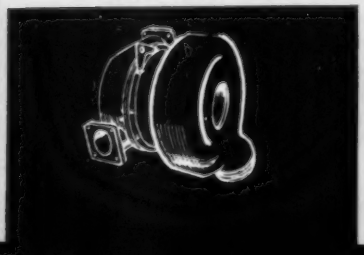
CATERPILLAR

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U. S. A.

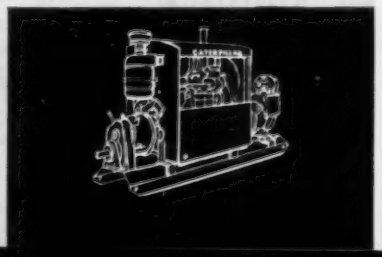
Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



Turbocharging is standard on most Cat Engines, giving more power per engine weight to make possible a much smaller engine package for a given horsepower.



Nine basic Cat two-handed Engines range in size from the 700 HP (maximum output rating) D397 Series D to the 75 HP D311 Series H. These can be matched with generators to meet your exact job requirements.



The Industrial Division of the Jeffrey Manufacturing Company, Columbus, Ohio, has realigned its field office operations with appointment of four regional sales managers and five district managers.

WILLIAM K. MYERS, formerly New York district manager, has been named regional sales manager—eastern region. Mr. Myers will coordinate the field activities of the Boston, Buffalo, New York, and Philadelphia district offices. Replacing Mr. Myers is PAUL LAWALL, who was manager, field offices at Columbus.

Named regional sales manager—east central region is HOWARD S. DAVIES. He previously managed the Pittsburgh office. Mr. Davies will be responsible for the field activities of the Bluefield, West Va., Columbus, Cincinnati, Cleveland, and Pittsburgh districts. PAUL HENDRY, formerly manager at Boston, replaces Mr. Davies at the Pittsburgh office.

ELMER F. LONGNECKER becomes regional sales manager—central region. Most recently district manager at Detroit, he will coordinate operations of the Chicago, Detroit, Milwaukee and St. Louis trading areas. Promoted to district manager, Detroit, is WILLIAM W. ETCHBERGER.

VERNON L. EKBLAD becomes regional sales manager—southern region. Formerly district manager at Houston, Mr. Ekblad assumes responsibility for the operations of the Birmingham, Houston and Jacksonville offices. Replacing Mr. Ekblad is CHARLES E. LAWALL, a sales engineer with the Philadelphia office.

Appointment of HOMER P. BINDER, as consultant, and of HUGH L. ROSS as manager, of the West Allis pump department of the General Products Division, has been announced by Allis-Chalmers Manufacturing Company, Milwaukee.

Mr. Binder, who joined Allis-Chalmers in 1911, had been manager of the department since 1942. Mr. Ross had been assistant manager of the centrifugal pump department since 1955.

MARTIN B. JAEGER was recently appointed to the newly created post of advertising manager for the Koehring Company, Milwaukee, Wis. The new position carries responsibility for directing the product advertising and publicity programs for all Koehring divisions and subsidiaries.

Mr. Jaeger, who joined Koehring on May 1, was formerly manager of advertising and publicity for the Bucyrus-Erie Company, South Milwaukee, Wis., as well as publisher of *Excavating Engineer* and *The Driller*. He had been associated with Bucyrus-Erie for 16 years.

E. J. Goes, publicity manager for Koehring, will continue in that position. A 46-year man at Koehring, Mr. Goes will be in charge of shows, conventions, exhibits, trade association activities, and other special sales promotion programs.

M. B. Jaeger

J. E. Adams

JOSEPH E. ADAMS, vice-president-manufacturing was elected executive vice-president for manufacturing and development for the White Motor Company, Cleveland, Ohio.

The position newly created in the White corporate structure was established as a result of the continuing expansion and diversification of White Motor's sales and product lines, which now embrace White, Autocar, Reo, and Diamond T trucks and transport tractors and White Superior diesel stationary engines.

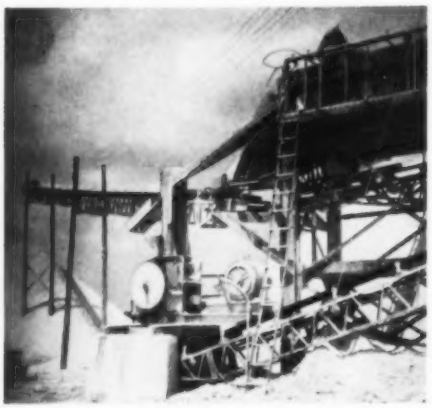
In his new capacity Mr. Adams will co-ordinate product research and development, manufacturing, advance engineering, and purchasing activities of all White Motor divisions.

Mr. Adams joined The White Motor Company in 1944 as production control manager. He rose to the position of vice-president manufacturing in 1956.

(*Continued on page* 184)

you get rock bottom operating costs with

BROOK A.C. MOTORS



Brook Motors cost less to install and they require a minimum of maintenance—there is no finer motor built. They are cutting costs in pits and quarries coast-to-coast, powering conveyors, crushers, screens and washers. Brook Motor shown drives a hammermill at Camp Rock Products Co., New Port Richey, Fla.—one of the many Brook Motors at this plant. Send for literature.

1 to 600 H.P.
All standard enclosures.

world's most respected motor

BROOK MOTOR CORPORATION

3302 W. Peterson Ave., Chicago 45, Illinois

In Canada: Brook Electric Motors of Canada, Ltd. 250 University Ave., Toronto.
Factory Representatives, Warehouses, Dealers in Principal Cities.

SINCE 1904
BROOK MOTOR CORPORATION

Enter 178 on card, page 155

Yes!...it's ALL STEEL

HP RANGE:
½ to 50 hp

RATIOS:
4:1—14:1—24:1 (or 20:1)

OUTPUT SPEED RANGE:
420 to 5 rpm

TORQUE RATINGS:
up to 41,000 lb-in
(Consult factory for higher torque capacity)

FALK ALL STEEL Shaft Mounted Drive

...Steel can "take it"!

STEEL frame ... of fabricated plate supports all rotating elements—provides double the ability of iron to maintain vital alignment of revolving elements, even under shock load or external impact.

STEEL housing ... will not fracture, serves only as protective cover and lubricant reservoir. Therefore, lubricant supply is safeguarded.

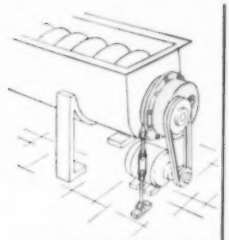
STEEL tie-rod and straddle-mounted tie rod brackets ... are fastened to heavy steel frame by steel bolts in double shear.

DELIVERIES TO MEET YOUR REQUIREMENTS

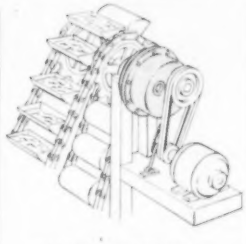
Off-the-shelf delivery from your Authorized Falk Distributor. *Shipment from factory or warehouse stocks* within 72 hours after receipt of your order.

Write for Bulletin 7100

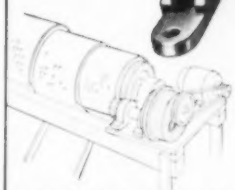
A FEW TYPICAL APPLICATIONS



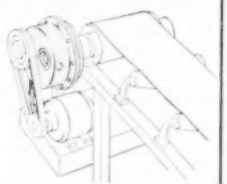
SCREW CONVEYOR



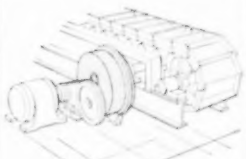
BUCKET ELEVATOR



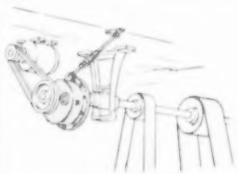
GRAVEL CLASSIFIER



BELT CONVEYOR



APRON FEEDER



LINE SHAFTING

THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.

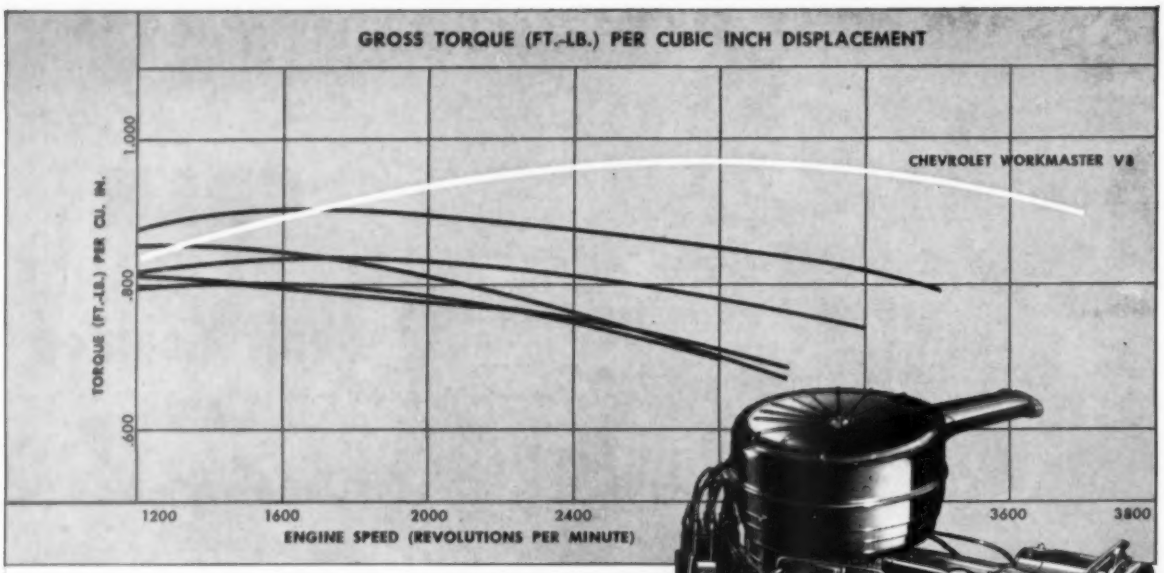
Representatives and Distributors in Most Principal Cities

Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

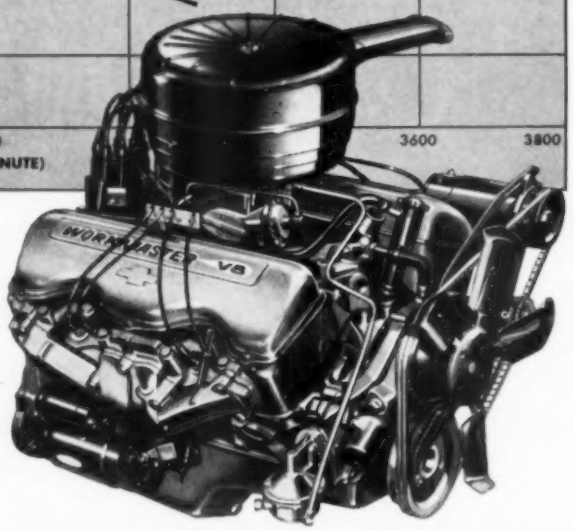
FALK

...a good name in industry

It's torque that beats tough jobs, and this engine has it to spare!



Proof that the Workmaster V8 puts out plenty of torque. The white curve above shows that the Workmaster provides high torque throughout the *entire range* of operating speeds. The black curves accurately represent the torque output of typical heavy-duty 6-cylinder engines of between 330 and 390 cubic inches of displacement. Curves demonstrate actual torque efficiency, based on gross ft.-lbs. of torque per cubic inch of displacement.



CHEVROLET'S 348-CUBIC-INCH WORKMASTER V8

It's torque that gives a truck plow-horse pulling ability at low speeds and assures the power to keep big loads moving, whether it's through the rough or over the road. And Chevrolet's 230-h.p. Workmaster V8 puts out a brand of torque that's made to order for your toughest big-tonnage hauls.

High torque output is the natural result of the Workmaster V8's unique design characteristics. Short piston stroke and large piston area, for example, comprise a torque-producing advantage, and *this engine provides the shortest stroke in its class.*

Advanced Wedge-Head design, with its fully machined combustion chambers, means high torque, too. It assures high turbulence of the fuel-air mixture and balanced power output from each cylinder. The Workmaster V8 has high volumetric efficiency . . . takes in the fuel-air mixture *efficiently* at all speeds. This, combined with a camshaft design that gives just the right valve lift and timing, assures high torque—extra pulling power to get you through the tough spots!

For the kind of torque and toughness you need to do big jobs better, see your Chevrolet dealer about a Workmaster V8, now standard in Series 90 and 100 trucks. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

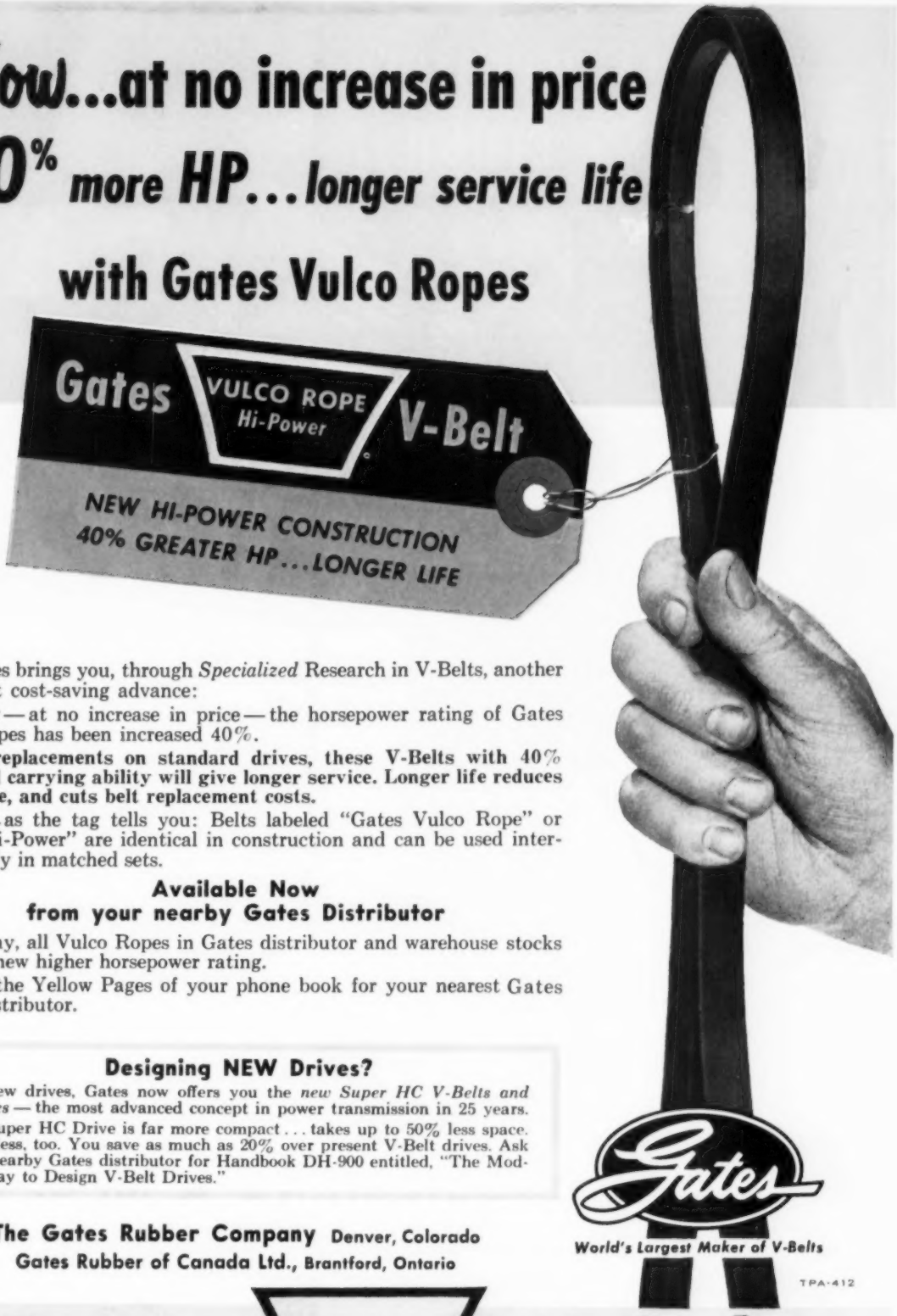
No job's too tough for a Chevrolet Truck!

CHEVROLET

Now...at no increase in price

40% more HP...longer service life

with Gates Vulco Ropes



Gates brings you, through *Specialized* Research in V-Belts, another important cost-saving advance:

Now — at no increase in price — the horsepower rating of Gates Vulco Ropes has been increased 40%.

As replacements on standard drives, these V-Belts with 40% more load carrying ability will give longer service. Longer life reduces down-time, and cuts belt replacement costs.

And as the tag tells you: Belts labeled "Gates Vulco Rope" or "Gates Hi-Power" are identical in construction and can be used interchangeably in matched sets.

Available Now from your nearby Gates Distributor

Today, all Vulco Ropes in Gates distributor and warehouse stocks have the new higher horsepower rating.

See the Yellow Pages of your phone book for your nearest Gates V-Belt distributor.

Designing NEW Drives?

For new drives, Gates now offers you the *new Super HC V-Belts and Sheaves* — the most advanced concept in power transmission in 25 years. The Super HC Drive is far more compact . . . takes up to 50% less space. Costs less, too. You save as much as 20% over present V-Belt drives. Ask your nearby Gates distributor for Handbook DH-900 entitled, "The Modern Way to Design V-Belt Drives."

The Gates Rubber Company Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates
World's Largest Maker of V-Belts

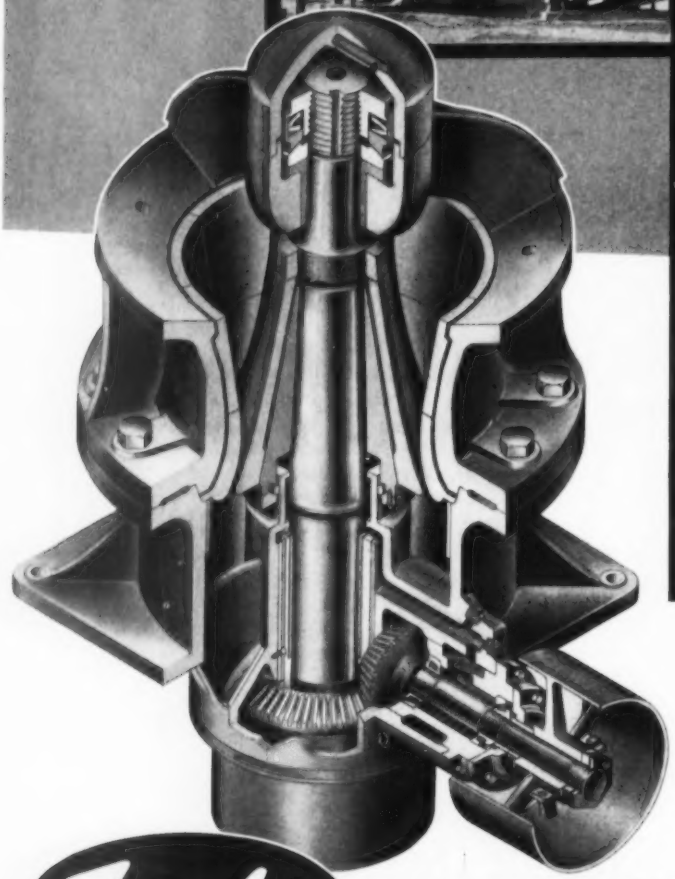
TPA-412

Gates VULCO ROPE Hi-Power V-Belts

type TY gyratory crusher

for secondary reduction

Shown at left is a 3'-0" Traylor Crusher in a rock and gravel producing plant. Above - 2'-4" TY Crusher in operation at sand and gravel plant.



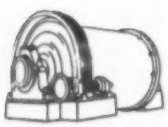
Traylor TY Secondary Crushers feature many original Traylor developments. Among them are the famous self-tightening bell head, curved concaves of manganese steel, and the patented Traylor dust seal that excludes dust and grit from the lubrication chamber. You buy many outstanding features when you buy Traylor — famous the world over for fine crushing machinery. Write for Bulletin No. 8112 today!

Traylor ENGINEERING & MFG. CO.

1165 MILL ST., ALLENTOWN, PA.

Sales Offices: New York — Chicago — San Francisco

Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P.Q.

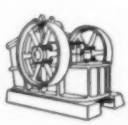


BALL MILLS

ROTARY KILNS

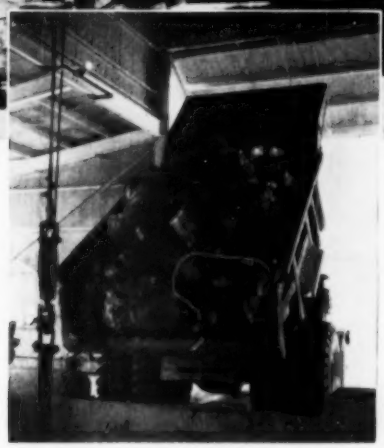
APRON FEEDERS

PRIMARY GYRATORY CRUSHERS



JAW CRUSHERS

SECONDARY GYRATORY CRUSHERS



"Euclids give us good service with low maintenance and keep our hauling costs at rock bottom"

LOUISVILLE CEMENT COMPANY, SPEED, INDIANA

Six 22-ton Euclid Rear-Dumps are hauling mortar stone, Portland cement stone and overburden at the Speed, Indiana, quarry of Louisville Cement Company. Working an 8 hour shift, three of these "Eucs" handle 400 tons per hour on hauls ranging from 1000 to 3000 feet. The wide bodies with struck capacity of 15 yards are loaded by a 4½ yd. shovel in four passes. Two other units are loaded by a 2½ yd. shovel. With loaded speeds up to 30 mph, they average 80 tons per hour on a 2 mile one-way haul. In addition, three of these "Eucs" work a second shift hauling overburden.

Louisville Cement Co., like hundreds of mine and quarry operators, has found that Euclid equipment moves more tons at lowest operating and maintenance cost. Dependable Euclid performance is the result of advanced engineering, rugged construction and almost 25 years experience with off-highway haulers.

To be sure you have the most economical hauling equipment, get a production and cost estimate from your Euclid dealer on the model best suited to your work — you'll find there are a lot of reasons why ***Euclids are your best investment.***

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

Manufacturers' News

(*From page* 178)

The Century Electric Company, St. Louis, Mo., has named F. L. BEATTIE district manager of the firm's Milwaukee office. Mr. Beattie has been acting manager since September, 1958.

The establishment of a district office in Philadelphia, Pa., has been announced by the Industrial Division of Joy Manufacturing Company, Pittsburgh. The office will serve Joy's Industrial Division customers in portions of Pennsylvania, New Jersey, Maryland, Delaware, Virginia, West Virginia, and the District of Columbia. Richard H. Schlobohm is district manager.

LAWRENCE H. HODGES has been promoted to the position of manager of the Rockford, Ill., Works of the J. I. Case Company, Racine, Wis. Mr. Hodges had served as chief product engineer of the Rockford Works since 1955.

As a further step in its expanded marketing program, the FWD Corporation, Clintonville, Wis., has named HUBERT MCCARTHY to head the newly-created market and distribution research department.

Mr. McCarthy comes to FWD from the Raymond Corporation, Greene, N. Y., where he was marketing research analyst.

Two executives of the Stephens-Adamson Manufacturing Company, Aurora, Ill., ROGER W. BARTON, export manager, and ERNEST T. ROLLINS, treasurer, were elected to the board of directors at the company's annual stockholders meeting held recently.

Re-elected directors were M. A. Kendall, chairman of the board; L. S. Stephens, president; D. L. Stephens, executive vice-president; G. A. Freeman, president of Stephens-Adamson Manufacturing Company Limited of Canada; and C. B. Hurd, R. W. Brauer, F. S. Wells, A. D. Sinden, and R. C. Pierce, vice-presidents.

Worthington Corporation, Harrison, N. J., has appointed CHARLES D. WOOD as manager of the Boston district office, succeeding RICHARD M. CLEVELAND, who will retire June 30. Mr. Wood joined Worthington at Boston in 1939 and has in recent years served as application and field service engineer and technical representative.

Mr. Cleveland's retirement comes after 42 years with the corporation. He joined the company's Holyoke Works in 1917, and was made district office manager at Boston in 1941.

C. D. Wood

A. W. Knight

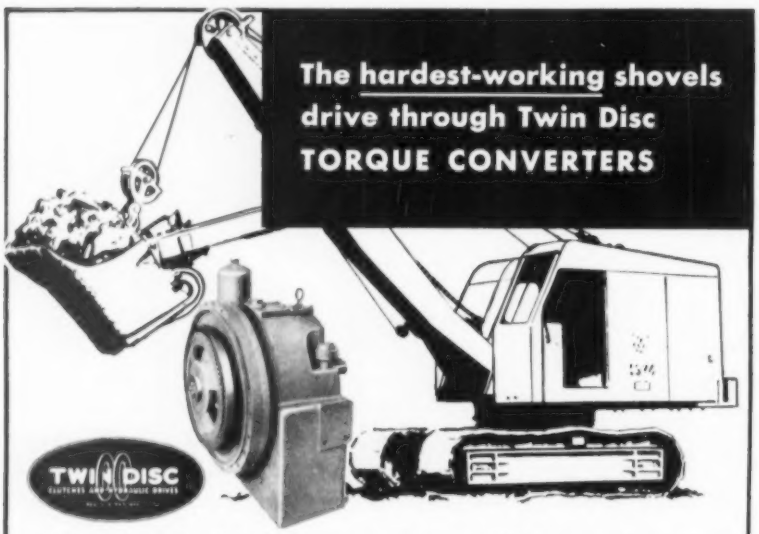
At the board of directors meeting in April, ALFRED W. KNIGHT was elected president of the Western Precipitation Corporation, San Francisco, Calif. He succeeds WALTER A. SCHMIDT, who remains as chairman of the board.

Mr. Knight joined the company in 1924. He was made vice-president in 1938, and was elected executive vice-president and general manager in 1956.

Mr. Schmidt leaves a post he has held continuously since 1911. He joined the company shortly after it was incorporated in 1907 and has directed its operation for 48 years.

At the meeting, William C. Volkel was named assistant secretary and all other officers were re-elected.

Directors of the Hercules Powder Company, Wilmington, Del., have re-elected all officers of the company as follows: Albert E. Forster, president and chairman of the board; Wyly M. Billing, John J. B. Fulenwider, John R. L. Johnson Jr., Paul Mayfield, Edward B. Morrow, vice-presidents; J. H. Tyler McConnell, secretary; and John E. Goodman, treasurer.



Evidence: All eight of the leading excavator manufacturers now offer Twin Disc Torque Converters as standard or optional equipment. Here's what Twin Disc Converters do for heavy duty machinery—

- **Cushion out the destructive shocks and vibrations that shorten equipment life.**
- **Eliminate lugging and stalling under heaviest loads.**
- **Deliver up to twice normal torque to drum even at slow digging speeds.**
- **Extend cable life by providing constant line tension without dangerous jerking.**
- **Permit delicate inching and holding under power.**
- **Automatically adjust torque ratio to load demand.**

Specify a Twin Disc Torque Converter —three-stage or single-stage; 30 to 1000 hp—on your next shovel, clam shell or dragline. For converting horsepower to profits, it's the wisest investment you can make.

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

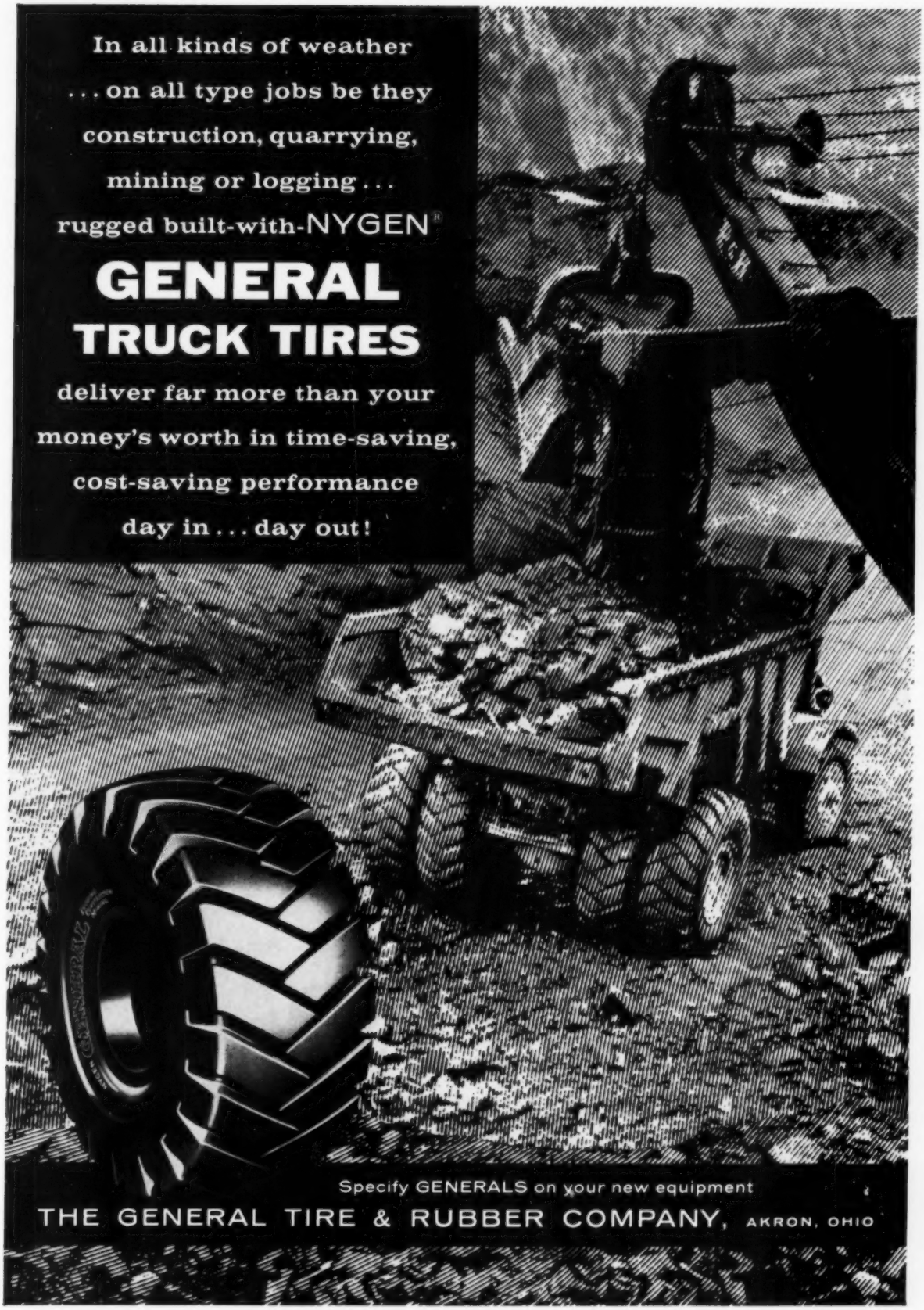
Branches or Sales Engineering Offices: Cleveland • Dallas • Los Angeles • Newark • New Orleans

Enter 184 on card, page 155

In all kinds of weather
... on all type jobs be they
construction, quarrying,
mining or logging ...
rugged built-with-NYGEN®

GENERAL
TRUCK TIRES

deliver far more than your
money's worth in time-saving,
cost-saving performance
day in ... day out!



Specify GENERALS on your new equipment

THE GENERAL TIRE & RUBBER COMPANY, AKRON, OHIO

Wear-O-Matic Hard Surfacing is 3 Ways Better

1 *Faster . . . More Economical*

The Wear-O-Matic process of semi-automatic hard surfacing is continuous welding with manual control of the arc. However, unlike manual welding with stick electrodes, there is no time consuming slag cleaning or electrode changes. Higher deposition rates, 3 to 5 times faster than stick electrodes, greater deposition efficiency, 85 to 95%, plus more available arc time add up to savings of 40 to 50% over manual hard surfacing with stick electrodes.

2 *Uniform Resistance to Wear*

The superior wear resistance qualities of Wear-O-Matic hard surfacing wires is the result of closely controlled manufacture, properly balanced alloys and fluxing agents, and precision drawing. Wear-O-Matic 7/64″ diameter open arc wires are precision drawn to true wire diameter ± 0.002″ and through drawing are densely compacted assuring an easier feeding wire that will not crush in the feed rolls or bind in the feed cable. Dense compaction and closely controlled fabrication combine to provide a weld deposit more uniform in chemistry and metallurgy resulting in uniform hardness and greater wear resistance throughout the deposit.

3 *Greater Efficiency and Ease of Application*

Here's a hard surfacing combination *designed* to cut maintenance cost through the *profitable* utilization of your welder's time. Wear-O-Matic wires in WELD-PAKS are the key to greater efficiency of both semi-automatic equipment and operator. Each WELD-PAK contains 100 pounds of wire packaged in a "dead cast" resulting in tension free, snarl free feeding. Because the WELD-PAK contains 2 to 4 times more wire than standard coils, the amount of time spent handling wire is lessened, providing more time for welding. WELD-PAKS are easier to handle and store; and on the job, the lid can be replaced after use assuring dirt and dust free wire when you are ready to resume welding. From set-up to finished job, the Wear-O-Matic process is easier and faster, eliminating overtime or providing more time for other maintenance jobs. Job test this time saving process in your own shop. Request Bulletin HS-132 for complete details. Alloy Rods Company, P. O. Box 1828, York, Pennsylvania.

Wear-O-Matic Wire Feed Unit
$279.00 f.o.b. York, Penna.
or El Segundo, Calif.

Weld-Pak is the trade name for this exclusive Wear-O-Matic package.

Alloy Rods Company

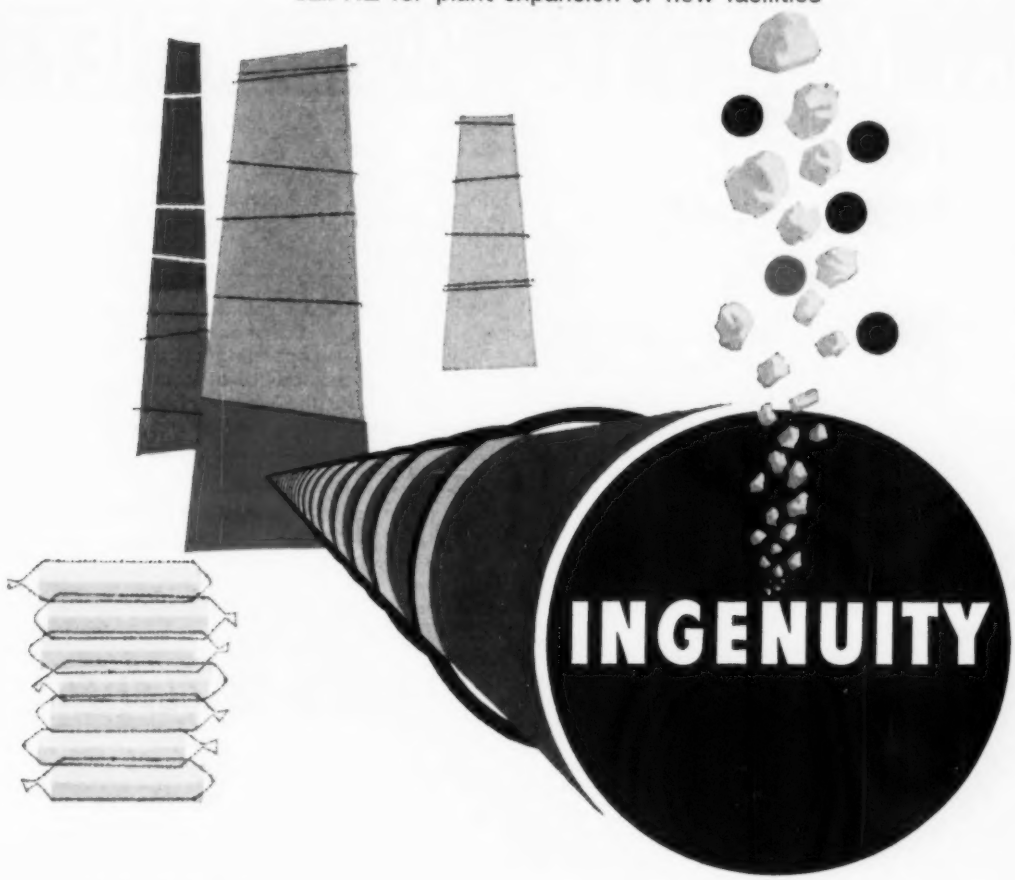
YORK, PENNSYLVANIA • EL SEGUNDO, CALIFORNIA

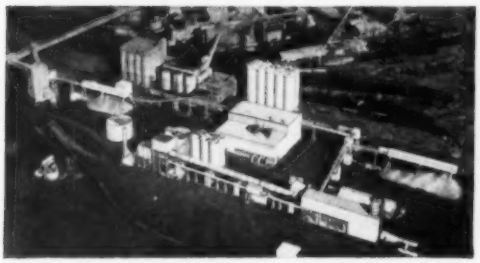
QUALITY WELDING ELECTRODES FOR

- Stainless Steel
- Low Alloy Steels
- Cast Iron
- Tool Steel
- Bronzes & Dissimilar Metals
- Hard Surfacing Electrodes & Wires

NO FINER ELECTRODES MADE . . . ANYWHERE

call KE for plant expansion or new facilities





1,250,000 barrel cement plant addition recently completed by KE for Marquette Cement, one of world's largest cement producers.

has made KE a major engineer-contractor serving the Minerals Industry

Placing of four fully-lined mills in a few hours instead of days—a unique center pier kiln drive —a 2,700′ cement transport "airway." With these and many more planned innovations and short-cuts, Kaiser Engineers completed Marquette Cement's Cape Girardeau plant expansion quickly and economically. Construction cost and time were well below industry average.

Mining, transportation, beneficiation, materials handling, processing in cement, gypsum, coal, ferrous and non-ferrous metals facilities—these are but a few of the fields wherein KE serves the Minerals Industries—from economic analysis through start-up.

KE ingenuity—multi-industry experience, keenly applied—can benefit your next facility. Let us show you how.

KAISER ENGINEERS engineers—contractors
Contracting since 1914

Division of Henry J. Kaiser Company • Oakland 12, California • New York, Pittsburgh, Washington, D.C., Buenos Aires, Calcutta, Dusseldorf, Montreal, Rio de Janeiro, Sydney, Tokyo

4367

WHAT MAKES YOU MORE MONEY?

1. Total Output...or Bucket Capacity?

ANSWER: *It's how fast you finish the job!* The M-F Work Bull 1001 with one-cubic yard payload is fast, maneuverable, and efficient. In competitive field demonstrations it has actually finished ahead of larger machines that cost thousands more. Let a Massey-Ferguson Industrial Dealer prove it .

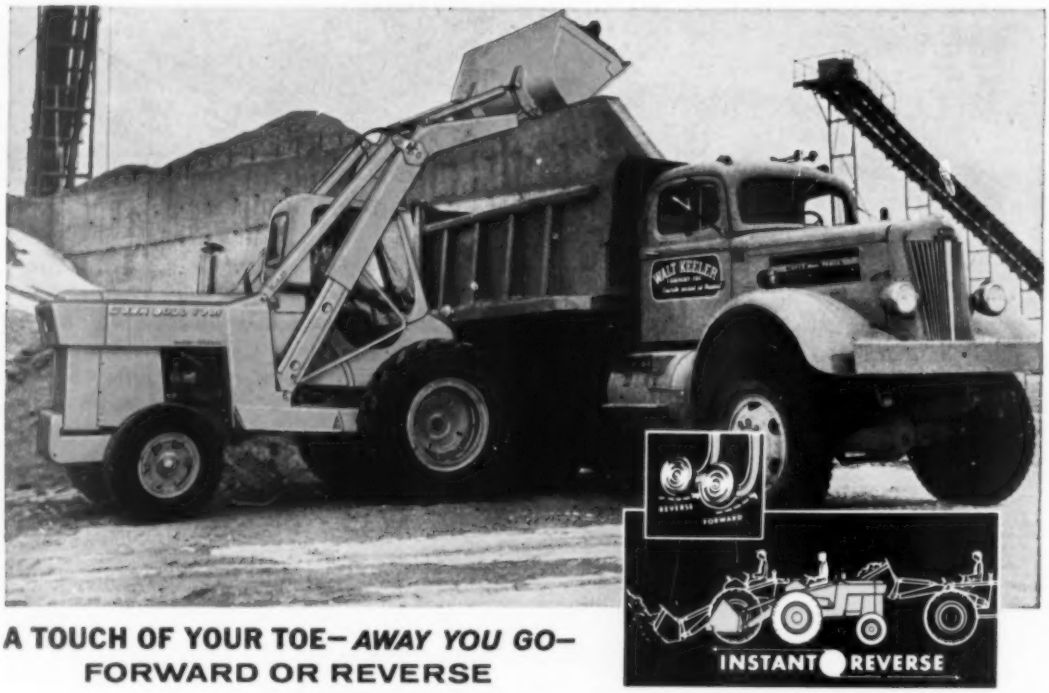
2. Performance...or Brute Strength?

ANSWER: *It's how well you do the job for the money!* The Work Bull 1001 makes maximum use of its power for lower operating costs. A unique direct-line thrust from low pivot points enables it to dig and transfer the weight of the payload to the drive wheels, adding traction and power.

3. Versatility...or Specialty?

ANSWER: Versatile equipment that makes a good profit on both large and small jobs. The Work Bull 1001 fills the gap between small utility loaders and expensive, specialized equipment. It's designed to be a master over a multitude of jobs and has many attachments.

MASSEY-FERGUSON'S WORK BULL 1001 MEETS THE *CHALLENGE!*



A TOUCH OF YOUR TOE—*AWAY YOU GO*—FORWARD OR REVERSE

Instant Reversing with Torque Converter on the Work Bull 1001 gives it unsurpassed maneuverability and speed on the job...No clutching... shifting...or levers to pull to change direction of travel!

Seeing is believing. Ask for an "on-the-job" demonstration today!

MASSEY-FERGUSON INDUSTRIAL DIVISION
1009 SOUTH WEST STREET • WICHITA 13N, KANSAS

Bethlehem Shaft Ropes at the O'Donnell No. 1—This headframe is at the O'Donnell No. 1 Mine, Four States, W. Va.—a high-quality steam coal operation of Rochester & Pittsburgh Coal Co., Indiana, Pa. The man-hoist rope, now in its eleventh year of service, is 1⅛ in. 6 x 27 Type H flattened strand Form-Set, improved plow steel, lang lay, fibre core. The materials-hoist rope is 1½ in. 6 x 27 Type H flattened strand Form-Set, improved plow steel, lang lay, fibre core. The cage has left-lay and right-lay hoist ropes to counteract any tendency of the cage to twist in the guide supports. The Bethlehem rope in this application is demonstrating the strength, endurance, and toughness for which it is well known.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem wire rope

BETHLEHEM STEEL

ONLY GARDNER-DENVER ROTARIES

Give you all these field-proved portable compressor advantages

Left to right, Models RP125, RP210, RP365, RP600, RP900.

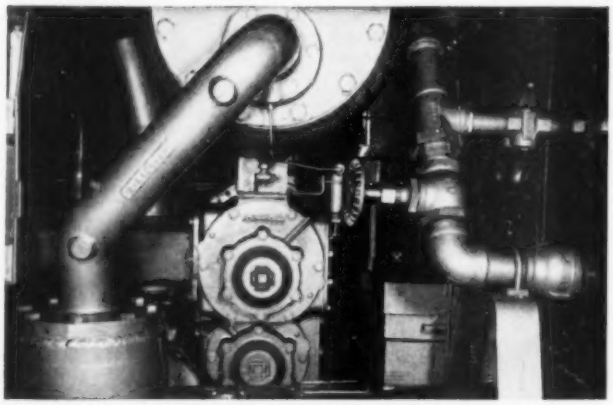
Safe, sure all-weather operation—water-oil cooling system keeps engine and compressor temperature constant.

Lubricated cold-weather starting—clutch allows compressor oil to be warmed before engaging compressor.

Positive flood lubrication—instantaneous oil flow not dependent on receiver pressure.

Fuel economy plus—exclusive Gardner-Denver "THRIFTMETER"® saves fuel, saves wear and tear on engine and compressor.

Simplified field maintenance—all compressor parts are easy to get to, making inspection and field maintenance faster and easier. See your Gardner-Denver distributor or write for bulletin.



The Gardner-Denver rotary requires no major dismantling job for inspection of working parts. Only a few minutes are required to remove the 12 cap screws to expose all the blades for routine inspection or replacement that assures trouble-free operation.

KEEPING TAB ON PROGRESS

At Gardner-Denver there's no substitute for men—our philosophy of growth for 100 years. Gardner-Denver engineers know your field from field experience . . . keep in constant touch with men and machinery . . . seek new ways of developing surer, safer, more productive equipment.

Gardner-Denver RP900's on Glen Canyon diversion tunnel job provide trouble-free air for all phases of this major project.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

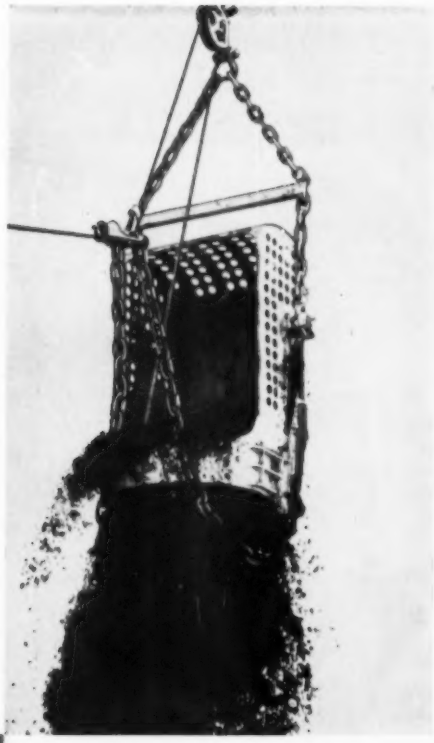
Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ont.

HIGHER PRODUCTION

LOWER COSTS

BIGGER PROFITS



HENDRIX DRAGLINE BUCKETS

3 types for every digging purpose

TYPE "LS" . . . *Lightweight*
A lighter weight bucket designed for levee and drainage work

TYPE "TS" *General Purpose*
Unexcelled for Medium-Duty Service

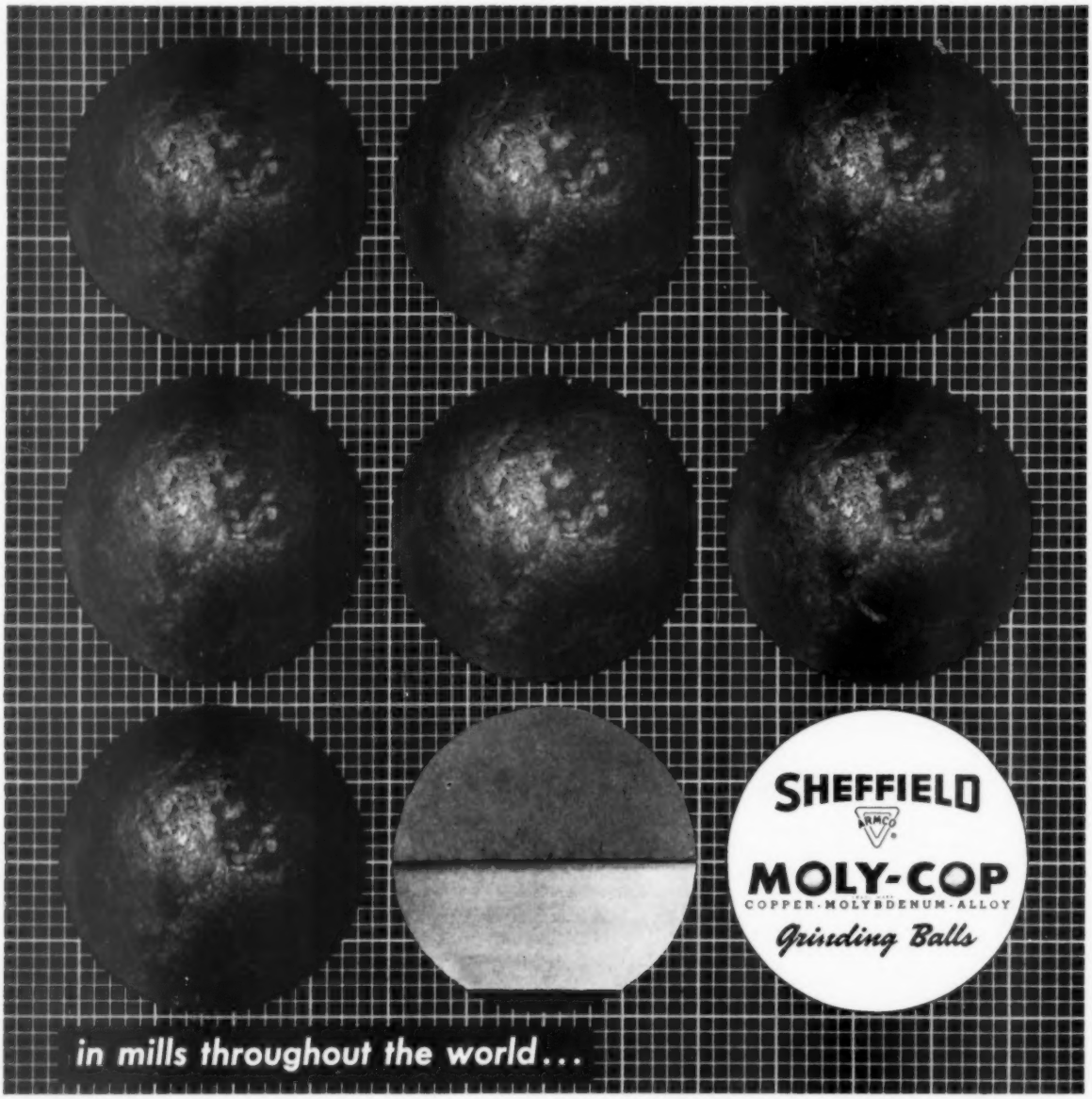
TYPE "HS" . . *Heavy Duty*
A heavy-duty bucket for moving shale, gravel and similar formations

¼ to 40 Cubic Yards

All Hendrix Buckets available without perforations

Hendrix Lightweight DRAGLINE BUCKETS

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA



The Standard of Comparison for UNIFORMITY

The alloying, forging and heat treating techniques used by Sheffield assure uniform quality. Fine, dense grain structure and the proved combination of hardness and toughness extend to the very core of a Moly-Cop ball. That's why Moly-Cops retain their spherical shape longer, save charging and down-time, and give you a better, longer grind at lowest cost per ton.

New steels are born at Armco

SHEFFIELD DIVISION

ARMCO STEEL CORPORATION

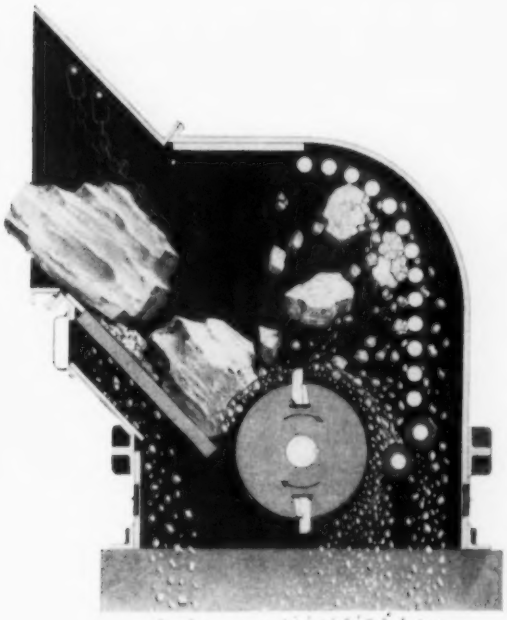
OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

FOR GREATEST

POSSIBLE

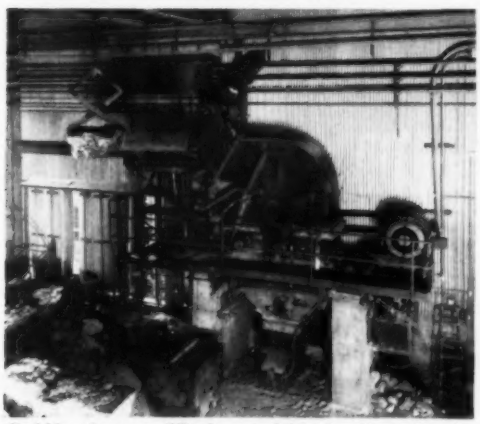
REDUCTION

IN ONE PASS...



THE JEFFREY ROCK BUSTER

24-inch carbon electrodes, 6 feet long, have been fed to this Rock Buster for seven years. Plant engineers are "amazed" at its continued fine performance.



Carbide, always a difficult material to handle, is literally *exploded* by impact in the Jeffrey Rock Buster and made ready for further processing.

Superior in performance and economy, this hard-hitting giant with its high speed impeller bars strikes the material in suspension . . . continues to wallop it until it's broken down to the desired size.

Feed the Rock Buster large, friable, non-abrasive materials and they're quickly reduced to a product of market size. (No wet or sticky materials; that's a job for the Jeffrey Mud Hog.) Size of finished product can be adjusted to meet your various requirements.

Crushing elements are made of manganese steel, enabling them to stand up in the toughest service. For a copy of Bulletin 854 describing the Rock Buster, write The Jeffrey Manufacturing Company, 917 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT . . .
TRANSMISSION MACHINERY . . . CONTRACT MANUFACTURING

PRESTRESSED!

Quaker Thermoid Conveyor Belting keeps rolling with the punches

Before it ever comes to you, the heaviest tension you'll put on Thermoid-Quaker Conveyor Belting has already been built in—and then released *after* curing. So the rubber and fabric are really in *compression* when you put the belting to work—ready for the toughest pull without overstraining the yarn or the cover.

There's a Thermoid-Quaker belting designed with just the combination of properties you need for each conveying job. To get the right belting for *your* needs, talk with the Thermoid industrial distributor nearest you, or write to *Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Sts., Philadelphia 24, Pa.*

Notice how the special ply construction of Thermoid-Quaker "VICTOR" Belting provides greater flexibility at the edges—more shock-absorbing rubber where the worst beating occurs.

THERMOID DIVISION PORTER **H.K. PORTER COMPANY, INC.**

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Copper and Alloys—RIVERSIDE ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

TODAY'S LOW-COST PRODUCER OF POWDERED MATERIALS

IT'S SIMPLE . . . COMPACT

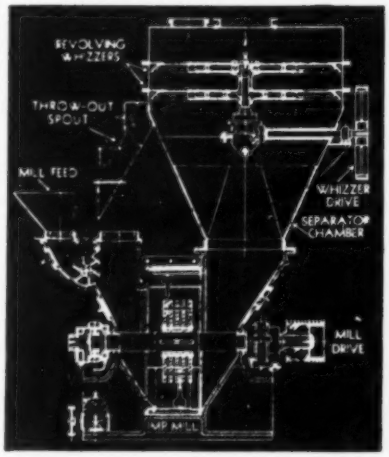
CLEAN . . . DUST-FREE

VERSATILE . . .

AUTOMATIC . . .

DEPENDABLE

RAYMOND
WHIZZER TYPE
IMP MILL



Cross-Section showing location of revolving whizzers and independent variable speed drive. Fineness controlled by one simple adjustment while mill is running. Insures uniform classification for quality product.

ECONOMY enters into all phases of the IMP MILL. It starts with the installation . . . where the flexible arrangement of piping and collectors permits easy adaptability to your plant layout.

There are also important economies in operation since automatic controls save time and attention . . . while the simultaneous pulverizing, classifying and/or drying . . . all combined in a single unit . . . shorten the process and simplify material handling.

Raymond rugged construction and precision-engineered design assure long service life and minimum maintenance. All these factors add up to important savings in production, and give you a lower cost advantage in these competitive times.

Write for IMP MILL Catalog No. 87 which shows the many applications of this multi-purpose unit . . . and how it can be adapted to your pulverizing job.

COMBUSTION ENGINEERING, INC.
Raymond Division

1122 W. Blackhawk Street
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

BETTER WELDS ★ SMOOTHER, EASIER APPLICATIONS ★ ADDITIONAL SAVINGS ★ BETTER WEAR RESISTANCE

a royal proclamation by

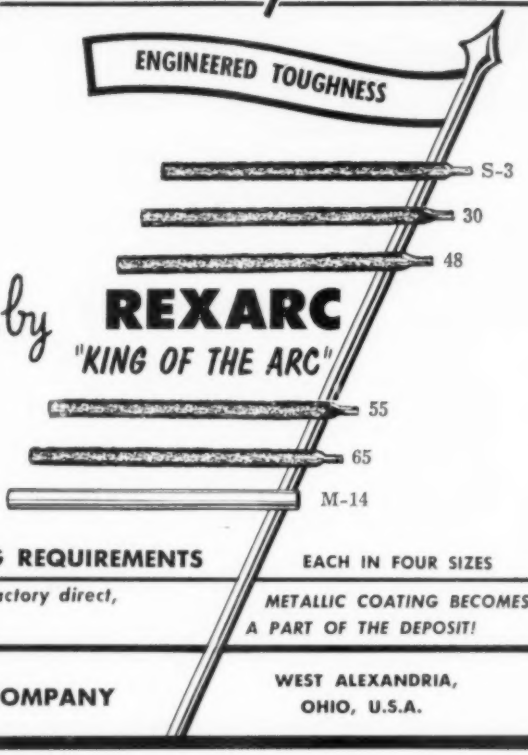
REXARC

"KING OF THE ARC"

presenting:

SIX ELECTRODES

TO COVER 95% OR MORE OF YOUR BUILDUP AND HARD-FACING REQUIREMENTS



EACH IN FOUR SIZES

Contact your nearest distributor, or the factory direct, for free 20-page manual

METALLIC COATING BECOMES A PART OF THE DEPOSIT!

MANUFACTURED BY
The SIGHT FEED GENERATOR COMPANY

WEST ALEXANDRIA, OHIO, U.S.A.

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A few copies still left . . .

LIGHTWEIGHT AGGREGATE PLANT MAP

Our newest combination map and listing is a *must* to anyone interested in the lightweight aggregate field. All lightweight aggregate plants known to be in existence are listed alphabetically, by state. In addition, the plant's address and the brand name of the lightweight aggregate it produces is given.

The map itself assists in graphically pinpointing the actual geographical location of all of the lightweight aggregate producing plants.

This combination map and listing is 25½ inches wide and 22 inches high. The sturdy paper stock it's printed on makes it ideal for framing or pasting on any flat surface.

The following are the quantity prices charged for this map.

QUANTITIES	PRICE
1 — 10 maps	35¢ each
11 — 20 "	30¢ "
over 20 "	25¢ "

We will be happy to fill your order for any number of maps you may desire.

PIT & QUARRY PUBLICATIONS

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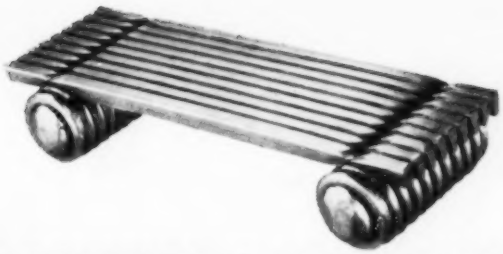
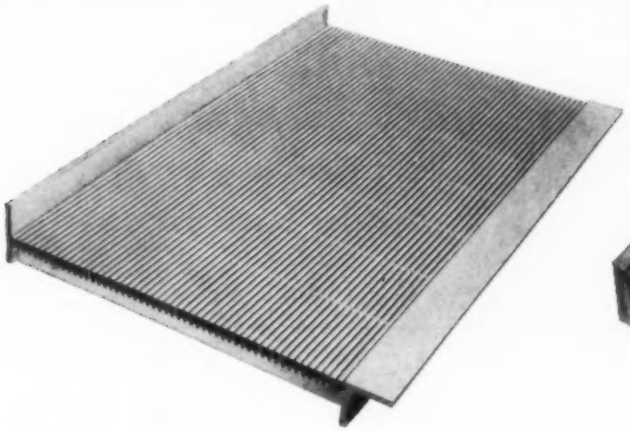
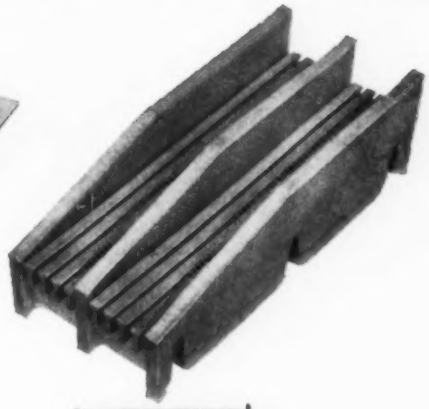


GET 5 IMPORTANT BENEFITS IN THESE HENDRICK SCREENS





1 REDUCED CLOGGING AND BLINDING

2 PRODUCT UNIFORMITY

3 FASTER PROCESSING

4 REDUCED WEAR FROM ABRASION

5 FABRICATION TO FIT YOUR OPERATING CONDITIONS

Perforated Plate with Hendrick H Quality Steel

Full clearance in Hendrick Perforated Plate practically eliminates blinding, permits faster processing. Uniformity of mesh provides product uniformity. Heat-treated H Quality high-carbon steel resists abrasion and screen damage.

Wedge Wire

Free clearance in Wedge Wire reduces chances of clogging and blinding. Tapered profile bar provides maximum water flow, increases dewatering efficiency. Deep profile bar stands up under extra-heavy loads, lengthens service life. Riffle tops are available for operating conditions involving highly abrasive materials.

Wedge Slot Screens

Accurately spaced, uninterrupted slots permit faster processing and dewatering, reduce chances of blinding. For product uniformity, parallel head flanges maintain uniformity of openings. For resistance to abrasion, Wedge Slot is available with Skid Bars that protect the screen against large chunks. Hendrick will gladly help you select, from 8 profile bars, the type that will stand up best under your operating conditions.

Hendrick

MANUFACTURING COMPANY

Headquarters for All Your Screening Needs

39 DUNDAFF STREET, CARBONDALE, PA.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring—Shur-Site Treads • Armorgrids • Hydro Dehazers • Distillation Column Internals

Hendrick Manufacturing Co.
39 Dundaff Street, Carbondale, Pa.

Please send me your catalog on:

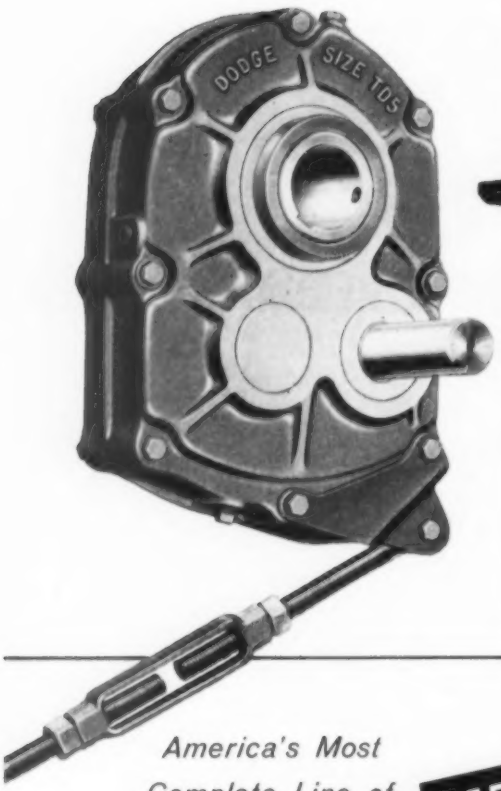
- ☐ H Quality Steel Perforated Plate
- ☐ Wedge Slot Screens
- ☐ Wedge Wire
- ☐ I would appreciate a call from a Hendrick Sales Engineer.

Name_____

Company_____

Address_____

City_____ Zone_____ State_____



Torque-Arm

THE DODGE DEVELOPMENT THAT CHANGED THE NATION'S HABITS OF SPEED REDUCTION

America's Most Complete Line of Shaft Mounted Speed Reducers

55 MODELS

- 1 to 200 hp. at 100 rpm!
- Output speeds from 10 to 378 rpm!
- Single Reduction
- Double Reduction
- 5 to 1 Ratio
- 15 to 1 Ratio
- 25 to 1 Ratio
- Any speed ratio up to 150 to 1 obtainable by selection of pre-determined combination of reducer and V-belt drive.

CALL THE TRANSMISSIONEER — your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

In fewer than ten years, the range of Torque-Arm Shaft Mounted Speed Reducers has increased from 6 to 55 models, to meet the ever increasing demand for this improved method of speed reduction.

By eliminating foundation, sliding base and flexible coupling this modern speed reducer has saved untold installation time and untold dollars of cost.

The rugged semisteel housing developed by Dodge has never been improved upon. It is corrosion resistant—and it has the strength to hold bearing seats in line for the life of the unit.

Dodge design provides wide spacing for the bearings. Loads are carried easily, contributing to Torque-Arm's long life and very high efficiency. The gears are finest quality—helical, heat treated steel.

Torque-Arm mounts vertically or horizontally in any position around the driven shaft. It locks to the shaft on *both* sides of the housing. The holes in the output hub provide simple removal with puller. Overload release and built-in backstop are optional.

Dodge Torque-Arm is America's most widely used shaft mounted speed reducer. It is stocked by your local Dodge Distributor. Ask him. Or write us for bulletin.

DODGE MANUFACTURING CORPORATION, 4000 Union, Mishawaka, Ind.

DODGE
of Mishawaka, Ind.

Ask your Allis-Chalmers dealer to show you **"And a Great Deal More"**

"This TL-20 Loader Gives Us the REACH We Need at $2,000 to $3,000 Savings on Purchase Price"

"With our crushed stone and lime loading specifications running in excess of 1,000 tons per day," asserted Mr. Walter Van Gorden, treasurer-manager, Cave Stone Company, Cave Indiana, "our requirements on loading equipment are as critical as on any of our manufacturing units. All of the efficiency and production engineered into our excavation and processing equipment is of little value if we cannot maintain like values on the delivery end.

"Because of this, we investigated every available loader on the market before buying our TL-20 TRACTOLOADER* in September, 1957. This decision was made on the basis of actual tests with each piece of equipment which indicated that the TL-20 consistently operated faster, reached farther, lifted higher and gave us more pounds per bucket than anything else in its class. *We would have had to spend $2,000 to $3,000 more for a machine which would equal its production potential.*

"Our two primary requirements for a loader are height and reach. If bucket capacity were our only concern, we could have approached the load of our present unit by simply buying a larger machine of the same make as our previous one. The TL-20 was the only one available in this price class with a two-yard capacity, but, *more important, was the height of the lift and the length of the reach.* With competitive machines, we would have to load the 8 to 14-ton trucks from both sides to get maximum load and balance. The TL-20, on the other hand, has a dumping height of 9 ft with a reach of 34 in. at this height. This increase means that we can easily load from one side without damaging the truck or holding up the driver over 4 minutes.

"Now, with this one machine, we are handling 80% of our loading, and have not yet extended it to its limits. We have yet to become involved with any type of maintenance other than the normal routine upkeep required on any piece of mechanical equipment. In spite of the rugged nature of the application, we expect a minimum of 5 years' service from the unit, and in all probability will replace it with an identical loader."

Let your Allis-Chalmers dealer show you how TRACTOLOADERS can increase your production.

*TRACTOLOADER is a registered Tractomotive trademark.

ALL TRACTOMOTIVE EQUIPMENT IS SOLD AND SERVICED BY YOUR ALLIS-CHALMERS DEALER

TRACTO—
a sure sign
of modern design

TRACTOMOTIVE
TRACTOMOTIVE CORPORATION • DEERFIELD, ILLINOIS

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AUCTION

COKE, GAS and CHEMICAL EQUIPMENT

of

CAMDEN COKE PLANT

Of The Public Service Electric & Gas Co.

Front & Chestnut Sts., Camden, N.J.

TO BE SOLD ON THE PREMISES—TO THE HIGHEST BIDDERS

TUESDAY, JUNE 23, 1959 AT 11 A.M. DST

The Public Service Electric & Gas Co. is ceasing the manufacture of coal gas at their Camden Coke Plant. All equipment used in this process is being liquidated. Certain coke processing and handling equipment is being retained until the disposal of the present stock of coke is completed.

American Pulverizer Ring Mill Crusher, type 38-S, 150/300 tons-per-hr. capacity. Penn Hammermill, size SXT-12, 125-tons-per-hr. Koppers Oven Charging Larry Cars, 10 ton capacity. Koppers Hydraulic Door Machines. Latimer Coal Spillage Bucket Elevator, 50 tons per hr., crushed coal Koppers Coke Oven Pusher 1947, 34′ C to C gauge, Atlas electric Coke Quenching Locomotive, standard gauge. Tippett & Wood Steel Sludge Settling Tanks, 42′ height. Steel Water Scrubbers 12′ diameter x 70′ height. Koppers steel inclined Drum Rotary Kiln, 4′ diameter x 30′ length. "Fluor Counter Flo" Cooling Tower 1954, Redwood with stainless steel fasteners. Koppers Elex Precipitator 8′5″ x 26′2″ height. Otis Elevator 118′6″ high travel, car size 2′10″ x 4′ x 7′4″ height. Complete Natural Gas-Air Jet Plant, 8 Schutte-Koerting Jets with rated capacity with 40-lb. gas; to produce 400 M-CFH, of 575 BTU gas. Five United Engineering Primary Coolers, 7′ diameter x 30′6″ height, Tar Decanter Separator 20′ x 46′ x 10′6″ deep, I-R Gas Compressors, duplex and compound types, I-R Turbo Exhausters 11,000–17,000 CFM capacity. Other Processing Equipment includes 2 Builders Coal Providence Proportioning and Weighing Equipment. Latimer Steel Bucket Elevator 15.2 tons-per-hr. Howe Larry Scale type 10-60. Koppers Hydraulic Door Machines, Koppers Steel Quenching Cars, Koppers and Barnes Coke Oven Gas-Air Reversing Mechanism. Hydraulic Door Jack. 2 Cottrell Gas Precipitators, Packaged Units designed to handle approx. 2 million cubic ft. coke oven gas per day. Patterson Hot Water Storage Heater, 500 gal. I-R, Elliott, and Alberger Barometric Condensers, 5,000/40,000 lbs. steam per hr. Sharples Sulphate Dehydrator Dryer Type C-20, 6 Andale After coolers, style 22 x A-12. Koppers Centrifugal Driers, 40″ basket. Hungerford & Terry Sand Filter, Research Engineering Mechanical Rectifiers, Koppers Ammonia Condenser, and Ammonia Still. Struther-Wells Heat Exchanger. United Filter Press, Sager Mud Mill, Lifting Magnets, and asstd. Rubber belt, steel Roller Conveyor Units, 13′11″ to 310′ long, 24″ to 42″ wide. Miscellaneous Plant Equipment includes: Terry 200 k. w. Steam Turbine, I-R single stage Air Compressors. Centrifugal, Reciprocating, Oil and Water Pumps, asstd. sizes. Large Steel Tanks, Recording Instruments, Generators, 956 New Cooler Tubes, 2″ diameter, 24′ long, #10 B-W gauge, C. I. Gas Valves 50 lb. and Machine Spare Parts. Rahn Larmon Gap Lathe, 24/48″ Swing x 6′ Gap, 16′ long. Landis heavy duty Pipe Threader 12″ capacity. Nat'l Bolt Threader, Cleveland Openside Planer 30″ x 8′ table, Nazel hydraulic Hammer size 4-D, Radial Drill, Toledo Hacksaw, Blount Grinder, Portable Electric Welders, small Bandsaw, Chain Falls, Pulley Blocks, Portable Electric Drills, Chipping and Scaling Hammers, Grease Gun Equipment, Space Unit Heaters, Fire Extinguishers, etc.

Exhibition: June 17, 18, 19 & 22 from 10 A.M. to 4 P.M. or by appointment

SAMUEL T. FREEMAN & CO. *Auctioneers*

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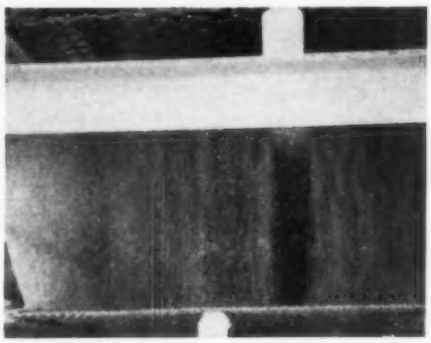
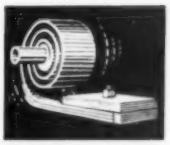


CAPACITY...PLUS...*in action!*

Overstrom Vibrating Screens are built to thrive on high capacity requirements! (Write Dept. PQ-4 for new 8-page catalog.)

LOOK FOR THE INVOLUTE SPRINGS . . . TRADEMARK OF DEPENDABLE SCREENING EFFICIENCY



OVERSTROM & SONS, INC.

2213 WEST MISSION ROAD • ALHAMBRA, CALIF.

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A subscription to

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PLATEGRIP

PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from 1/4" to 1 1/2" thickness. *Write for Catalog Sheet.*

ARMSTRONG BRAY & CO.

5319 Northwest Highway, CHICAGO 30, U. S. A.

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PANG

for fast, on-the-spot

CONVEYOR BELT REPAIRS

Exclusive cold self-vulcanizing material

- No heat, no equipment needed
- Applied without removing belt
- Ever-last bond won't melt, unaffected by moisture, petroleum, most acids
- Eliminates danger of heat damage to belt during repairs
- PANG cuts repair costs, adds years to belt life

Write for prices and details:

PANG
AUTOMATIC VULCANIZERS CORP.
16 Hudson Street, New York 13, N. Y.

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Announcing . . .

TERRIFIC USED EQUIPMENT BARGAINS

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See **PIT & QUARRY'S** *Broadcast Section*

PAGES 205-212

WRITE FOR OUR RATE CARD

A BOON TO TRUCK CRANE OWNERS

INCREASE YOUR MOVING CAPACITY in both Short and Long Stick operations UP TO 50% with

ROLLING OUTRIGGERS

TRADE MARK PATENT PENDING

that FIT ALL MAKES AND MODELS OF TRUCK CRANES

- ALLOW NEAR-CAPACITY LOADS TO BE MOVED OVER LEVEL AND RUGGED TERRAIN
- ELIMINATE COSTLY, TIME-CONSUMING PRACTICE OF SETTING AND RE-SETTING OUTRIGGERS AND PADS
- ALLOW GREATER LOAD DISTRIBUTION AND PREVENT OVER-STRESSING CRANE CARRIER
- TANDEM, PIVOTAL ACTION WHEEL ASSEMBLY
- RUGGED CONSTRUCTION
- INSTALLED IN FIVE QUICK MINUTES

One Pair Single Tandem Units, Weight approx. 1360 lbs.
One Pair Double Tandem Units, Weight approx. 2830 lbs.

"ROLLING OUTRIGGERS" INSURE MOBILITY, SAFETY AND INCREASED PROFITS

Manufactured by Lincoln Welding Works, Inc., 1320 So. "A" St., Las Vegas, Nevada

WRITE FOR NAME OF "ROLLING OUTRIGGERS" DEALER IN YOUR AREA

SOME EXCELLENT DEALERSHIPS ARE STILL AVAILABLE

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DREDGE SLEEVE CLAMPS

Sturdy • Practical • Dependable • Economical

Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U.S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply . . . positive in action. Write for illustrated folder, today.

THE BLACK BROTHERS CO., INC.
9th Ave. at 4th, Mendota, Illinois

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A welder caused us to caucus

The note from an employee suggestion box read "How come a company like this hasn't got the U. S. Savings Bond Payroll Savings Plan". It was signed by a welder in the fabricating department.

Since we actually *do* have Payroll Savings this told us two things: (1) Probably more employees than we imagined wanted the advantage of buying U. S. Bonds automatically through Payroll Savings. (2) We had grown lax in bringing our Plan to their attention.

But what to do? The solution was simplicity itself.

We called in our State Savings Bonds Director. He provided all the promotional materials needed to arouse interest in U. S. Savings Bonds. Then he helped to conduct a personal canvass and place an application blank in everyone's hands.

The results were amazing. Employee participation shot up to a percentage that we could take pride in. There was no "hard selling", nor was work interrupted. Our people wanted the security U. S. Savings Bonds offer them.

Today there are more Payroll savers than ever before in peacetime. Your State Director will be happy to help you install a Payroll Savings Plan or build enrollment in one already existing. Look him up in the phone book or write: Savings Bonds Division, U. S. Treasury Dept., Washington, D. C.

Pit and Quarry Publications, Inc.

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTIC DONATION, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

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Can you hear the THUNDERING silence of downtime?

NOT HERE! Bucyrus-Erie balanced engineering keeps production humming

A quiet job is a job in trouble.

The roar of trucks on the move . . . the smack of a shovel biting off a load . . . *these* are the money-making sounds of production. And to lick the problem of excessive downtime, *many quarry operators choose Bucyrus-Erie electric shovels.*

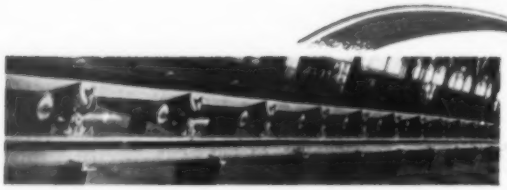
Behind this popularity is Bucyrus-Erie's consistently high performance . . . backed by *Balanced Engineering.* Heavy-duty construction throughout keeps the shovel working, holds down maintenance, assures long service life. Power is delivered smoothly, accurately and dependably . . . doesn't go "down" at frequent intervals for tricky adjustments or servicing.

Your Bucyrus-Erie man can give you the full story on Balanced Engineering on the 4½-yd 110-B, 6-yd 150-B and 8-yd 190-B. Call him soon, or write Bucyrus-Erie Company, South Milwaukee, Wis., Dept. 1LD.

BUCYRUS ERIE®

Builds Better Equipment

Profitable MATERIAL HANDLING *with* EHRSAM



BELT CONVEYOR

The Ehrsam line of Conveyor Rolls fills a definite demand for a conveyor that will combine dependable high performance with low maintenance cost for maximum profit. Ehrsam Conveyor Rolls are available in any belt widths with many styles and heights. For additional information write Department B for your catalog 2-A.

TRIPPERS

The Ehrsam Tripper is designed for top performance. It is easily serviced. Most working parts are accessible, yet protected for the operator's safety. All spouting is engineered to give full capacity discharge. Many styles of trippers are available, and can be designed to suit your special application.

The J. B. Ehrsam and Sons Mfg. Co.
Enterprise, Kansas

KANSAS CITY, KANSAS — PHOENIX, ARIZONA

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EHRSAM PACIFIC, INC.	SAN FRANCISCO, CALIFORNIA
WILKS-BERMEL CO.	LANCASTER, NEW YORK
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More capacity... size for size!

Crosby-Laughlin Load-Rated® Shackles

Designed to new safety standards

- **Heat treated bows**
- **Heat treated alloy pins**
- **Guaranteed capacity**
- **50% stronger than ordinary shackles**
- **Safe working load forged in every shackle**

Stocked and sold by leading mill supply, construction and industrial equipment distributors.

Write for FREE specifications catalog listing the most complete line of drop forged fittings for wire rope and chain.
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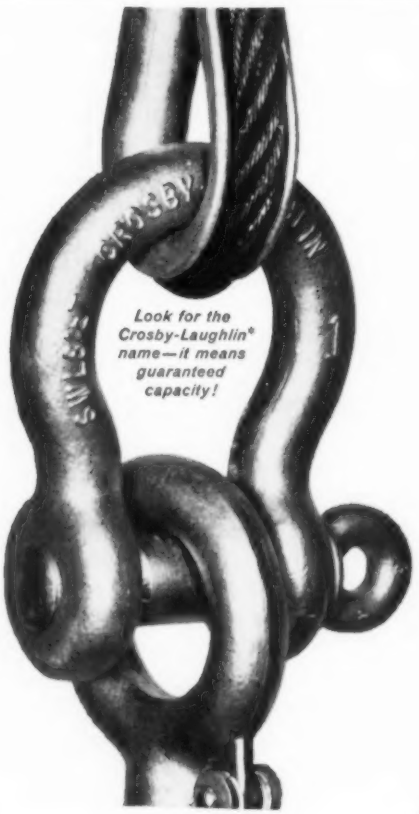
CROSBY-LAUGHLIN *Division*
AMERICAN HOIST & DERRICK COMPANY
FT. WAYNE, INDIANA

Manufacturers of Crosby Clips and "Load-Rated" Blocks . . . Crosby-Laughlin "Load-Rated" Fittings . . . Lebus Load Binders and Snatchblocks.



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PIT & QUARRY

431 S. Dearborn St. Chicago 5, Ill.

BROADCAST

Section

PLANT ENGINEER WANTED

Multi plant cement company needs engineer. Opportunity for training and advancement. Give full details on background. Replies confidential.

Box No. PQ-201-F, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

FOR SALE

Marion dragline—Model 360—Serial No. 6171, Electric power by G.E. 435 H.P. Motor 2300 volt. 175 ft. boom with one eight cu. yd. and one ten cu. yd. drag buckets. Location 10 miles s.w. of Kinder, La., within one mile of r.r. connections or 5 miles navigable river. Operating when shut down. Offered for immediate disposition.

Box No. PQ-207-E, c/o Pit & Quarry
431 So. Dearborn St. Chicago 5, Ill.

MASTER MECHANIC WANTED

Large cement company needs master mechanic. Must have supervisory ability and be familiar with machine shop operations. In reply, give experience, references, and salary desired. Replies confidential.

Box No. PQ-201-D, c/o Pit & Quarry Publications
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DESIRE SUPERVISORY POSITION

B.S. Mining and Geological Engineering. Six years experience in all types of drilling and blasting. Thirty-five years of age, married. Prefer midwest, northwest, or west.

Box No. PQ-202-F, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

CHIEF ENGINEER

Midwest cement producer needs man for responsible staff position as head of engineering department. Prefer man in early thirties with imagination, initiative and administrative abilities to supervise and develop department engaged in design, construction and modification of cement plant equipment. Require engineering degree and related experience in heavy industrial processes such as mining, crushing, grinding, conveying, calcining, etc. Attractive salary, benefits and opportunities. Reply in confidence with detailed resume of background and earnings to

Box No. PQ-210-F, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

WANTED—QUARRY SITE

Located in Eastern section of Middle Atlantic States. Stone must meet state hardness specs. Send full particulars to:

Box No. PQ-208-F, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

FOREMAN

Location—Midwest

Applicant must have Heavy Construction, Quarry, or Aggregate Processing experience. Group Insurance, Pension, and other fringe benefits.

Box No. PQ-204-F, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED

Service and Erection Representative having experience with Crushing, Cement and Lime Plant machinery.

Box No. PQ-209-F
c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

GYRATORY CRUSHER

Allis-Chalmers—8K primary crusher w/spare shaft and mantle.

L. J. LAND, INC.

Weehawken, N. J.
Box 689 Union 4-1010
Reading, Penna.
Box 756 FRanklin 5-8474

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1—unused 7'6" x 42' kiln, ½" shell, 10' combustion chamber, Todd oil burner, 20 HP gearhead motor-drive NEVER USED!

DRYERS-KILNS

11' x 155' Traylor kiln, ¾" shell
8' x 170' kiln, ¾" shell, (3) tires
8' x 115' United kiln, ½" shell
8' x 50' Vulcan kiln, ¾" shell
7'6" x 100' Kiln, ½" shell
7'6" x 60' dryer, ½" welded shell
7' x 50' A-C dryer, ⅜" shell
6' x 60' kiln, ¾" shell
8'8" x 70' Double-shell, Hardinge #XA-18, indirect-direct dryer, ½" shell
6' x 30' Louisville dryers
5'6" x 50' Renneberg, ⅜" shell, dryer
5'6" x 31', 4'8" x 33', ½" shell, dryers
4'6" x 40', 4'6" x 32', ⅜" shell, dryers
4' x 24' brick-lined rotary kiln

MILLS

ROD, Kennedy 4' x 8', 50 HP, EPD
ROD, Marcy 7' x 15', 4" liners, 300 HP
CONICAL, Hardinge 4'6" x 16", 25 HP
CONICAL, Hardinge 6" x 36", 75 HP, herringbone gears, complete
BALL-TUBE, Allis-Ch. 5' x 22', 150 HP
BALL-TUBE, Allis-Ch. 6' x 16'
BALL, Kennedy 4' x 8', 50 HP, E.P.D.
HAMMERMILL, Penna. Crusher #5060, 400 HP, non-clog, 1952, unused
COMPEB, Allis-Ch. 7' x 24', 450 HP. (Can be converted to rods)

CRUSHERS-PULVERIZERS

GYRATORY, Kennedy #49S, 12", 100 HP
JAW, 18" x 9", 20" x 6', 36" x 15"
ROLLER, Raymond #15, 66", 6-roll, 200 HP
PULV., B & W Type E-32, 75 HP
SAWTOOTH, Robinson #13, 36", 15 HP

MISCELLANEOUS

BOILERS, Keeler 200 HP, 160 PSI
BRIQUETTING PRESSES, Komarek-GREAVES 75, 10 HP
BUCKET ELEVATORS, 62' & 90' c-c
SCREENS, 4' x 6', 4' x 8'
PUG MILLS, 150, 50, 25 HP
APRON FEEDERS, 36" & 48" wide
STORAGE BINS, welded steel, conical bottom, 6,000-80,000 gal.

PERRY EQUIPMENT CORPORATION
1414 N. Sixth St. Phila. 22, Pa.
POplar 3-3505

MOTORS AND GENERATORS

All sizes, new and rebuilt. Starters, accessories, pulleys and repair parts. Gear motors, Falk Shaft mounted Speed Reducers, couplings and V-belt drives.

EXPERT REPAIR SERVICE
NUSSBAUM ELECTRIC CO.
220 E. Douglas Avenue Fort Wayne, Ind.

WANTED

SAND AND GRAVEL OPERATION

Imperative operation be a bargain with good market for products. Please give details in first letter.

Box No. PQ-203-F, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

FOR SALE

1—Kolman Vibrating Screen, Model S-B-70 and 24 inch feeder plate with flared hopper, mounted on frame & trailer as one unit.
1—40 ft. Sam Mulkey conveyor, 14 inch belt.
1—24 ft. Sam Mulkey conveyor, 14 inch belt.
Both complete with Wisconsin motors.
Above equipment same as new. Discount. Write

FRED E. BOETTCHER
Star Rt. 3 Atkinson, Nebraska

FOR SALE

4 x 12, 3 deck simplicity Vibrator Serial No. 412-717F, purchased new in 1953. First Class Shape—$2500.00.

1—Bull Wheel for derrick, 12' in Diameter.

THE BEDFORD-NUGENT CORP.
624 N. Riverside Evansville 8, Indiana

500,000 FT. 8 IN. PIPE

Wt. 28 lbs., Lapweld. Plain and Beveled. 20 or 40 ft. lengths, No. 1 grade. Also 35,000 ft. 40# 10" Plain end. No. 1.

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Decatur, Indiana

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Rebuilt — A-1 Condition
48B Bucyrus Erie Shovel, 2 cy Diesel
Northwest Model 6 Shovel, 1½ cy.
Caterpillar D6 Bulldozer

WILLIAMS CONSTRUCTION COMPANY
Box 145, Balte 20, Md. Murdock 6-8604

GOOD USED CONVEYOR BELTING

16", 18", 20", 22", 24", 28", 30", 36", 42" and 48". Belting is guaranteed free of holes or serious abrasions. 5 or 6 ply.

THE BARCA BELTING CO.
1230 Sheridan Rd. Kenosha, Wisconsin
Phone OL 4-6630

3 Blaw Knox 60 Ton Bins
Single Compartment
Price—$1500 (Unused)

Aggregate Equipment & Supply Co.
811 Lehmann Bldg. Peoria, Ill.

FOR SALE BY OWNER

One 10" Style "B" Newhouse Crusher Serial No. 8399—fully assembled, complete with electric motor, cooling system and some spare parts. Location St. Paul, Minn. Make an offer. Offer subject prior sale.

J. L. SHIELY COMPANY
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KILNS—COOLERS—DRYERS

7'x50' Ruggles-Cole Rotary Dryer
7'x60' Bonnet Rotary Dryer
8'8"x70' Ruggles-Cole Rotary Dryers
8'x115' Vulcan Rotary Kiln
8'x125' & 8'x100' Rotary Kilns
11'x155' Traylor Rotary Kiln
6'x50' & 6'x25' Rotary Dryers
705-24, 502-16 Roto Louvre Dryers

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Jeffrey Hammermills 15"x8" to 24"x18"
Pennsylvania C-3-30 Hammermill 60 HP
Dixie Jr. 2424 Non-Clog Hammermill
Raymond 5 Roll Low Side Mills
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Hardinge 8'x30"&10'x48" Conical Mills
14' Gayco Dust Collectors
Tube Mill 6'6"x21'—350 HP Synch.
30"x14' & 40"x13' Pug Mills

MISCELLANEOUS

Clyde Hydrator #3 complete
18"x16'; 36"x6'; 48"x8' Apron Feeders
24"x18' Pan Feeder
60' to 90' Centers Bucket Elevators
2000'—16" to 42" Belt Conveyors
4'x6' & 4'x8' Tyler Hummer Screens
15 to 200 ton cap. Steel Bins
10 ton Gas/Elec. Locomotive 36" ga.
25 ton Diesel/Elec. Locomotive 36" ga.

Write for detailed booklet

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ROCK PROD. EQPT. DIV.
60 East 42nd St., New York 17, N.Y.
310 Thompson Bldg., Tulsa 3, Okla.

RELIABLE HEAVY EXCAVATION EQUIPMENT

DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS

15-W Bucyrus Erie Elec. Drag, 215', 12 yd.
9-W Bucyrus Erie Elec. Drag, 160', 11½ yd.
9-W Bucyrus Erie Diesel Drag, 200', 9 yd.
7400 Marion Diesel Drag, 175', 13 yd.
7400 Marion Elec. Drag, 175', 12 yd.
625 Page Diesel Drag, 150', 10 yd.
621-S Page Diesel Drag, 125', 7 yd.
200-W Bucyrus Erie Diesel Drag, 125', 6 yd.
5-W Bucyrus Erie Diesel Drag, 100', 6 yd.
2400 Lima Dragline, 130', 5 yd.
4500 Manitowoc Drag, 120', 5 yd.
120-B Bucyrus Erie Elec. Drag, 115', 5 yd.
111-H Marion Drag, 100', 4 yd.
1601 Lima, 4 yd., Shovel/Drag
3900, 3500 & 3000 Manitowoc Cranes
5560 Marion 26 yd. Elec. Shovel
750-B Bucyrus Erie 20 yd. Elec. Shovel
5480 Marion 18 yd. Elec. H. L. Shovel
151-M Marion 7 yd. Elec. Shovel
170-B Bucyrus Erie 6½ yd. Elec. Shovel
4161 Marion 6 yd. Elec. Shovel
2400 Lima 4½ yd. H. L. Shovel
120-B Bucyrus Erie 4 yd. Elec. Shovel
4500 Manitowoc 5 yd. H. L. Shovel
111-M Marion Standard & H. L. Shovels
3500 Manitowoc Standard & H. L. Shovels
54-B Bucyrus Erie Standard & H. L. Shovels
Large selection of smaller Shovels & Draglines available
Model T-750 Reich Truck Mounted Rotary and Down-the-Hole Drill
McCarthy & Compton Coal Auger Drills
Euclid trucks, truck cranes, dozers, scrapers, front end loaders, attachments and other misc. equipment available

FRANK SWABB EQUIPMENT CO., INC.
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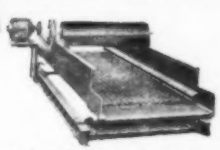
BONDED QUALITY BARGAINS

GENERAL DUTY AND HEAVY DUTY VIBRATING SCREENS



More than 7000 Mines and Quarries have modernized with Bonded Equipment

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2' x 4' to 3' x 8'. **WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1086. #1086.**

Model Number	Screening Area	No. of Decks	Sale Price
124A	2'x4'	1	$ 443
224A	2'x4'	2	472
126A	2'x6'	1	472
226A	2'x6'	2	501
134A	3'x4'	1	504
234A	3'x4'	2	570
136A	3'x6'	1	581
236A	3'x6'	2	688
336A	3'x6'	3	958
138A	3'x8'	1	675
238A	3'x8'	2	815
338A	3'x8'	3	996

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14'. 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST BUY.**

Model Number	Screening Area	No. of Decks	Sale Price
336B	3'x6'	3	$1820
436B	3'x6'	4	1685
138B	3'x8'	1	1510
238B	3'x8'	2	1620
338B	3'x8'	3	1735
248B	4'x8'	2	2310
348B	4'x8'	3	2440
2410B	4'x10'	2	2400
3410B	4'x10'	3	2550
2412B	4'x12'	2	2590
3412B	4'x12'	3	2970
4412B	4'x12'	4	3165

BONDED ® TROUGHING IDLER CONVEYOR BARGAINS

CONVEYOR PRICES INCLUDE BELTING

Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2 1/4" or 2 7/16" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1138.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1189 AND PRICES.**

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Foot
14"	25'	$1397	$ 738	$16.84
14"	50'	2222	1159	
14"	85'	3377	1748	
16"	20'	1262	667	18.04
16"	45'	2137	1118	
16"	60'	2662	1388	
16"	90'	3712	1930	
18"	25'	1477	797	19.24
18"	45'	2217	1182	
18"	70'	3142	1663	
18"	85'	3697	1952	
18"	100'	4252	2240	
18"	130'	5362	2817	
20"	25'	1517	835	20.37
20"	60'	2882	1548	
20"	75'	3467	1854	
20"	90'	4042	2159	
24"	25'	1590	898	21.78
24"	45'	2430	1334	
24"	70'	3480	1878	
24"	100'	4740	2532	
24"	120'	5580	2967	
24"	150'	6840	3621	
30"	50'	2911	1617	24.75
30"	70'	3871	2112	
30"	90'	4831	2607	
36"	25'	1818	1118	27.95
36"	45'	2858	1677	
36"	60'	3638	2096	
36"	100'	5718	3214	

BONDED ® QUALITY BUILT BUCKET ELEVATORS

ENCLOSED ELEVATOR

Open or Enclosed, Vertical or Inclined Bucket Elevators with Continuous or Spaced Buckets mounted on Chain or Belting. Bonded's 19 standard models mean lower prices and you get a Custom Built Elevator at no extra cost. Open and other types prices on request. There is a style of bucket for virtually every material or condition; wet or dry, lumpy or fine, granular, slivery, or pellet shapes, hot or chemically active.

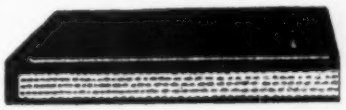
Prices listed at right are for Vertical Enclosed Elevators. Standard Elevators with Chain mounted buckets use #477 or #C102B combination chain, 4, 5 and 6 ply, 32 oz. or 35 oz. duck belt is used on Belt mounted Bucket Elevators.

Bonded Bucket Elevators are Jig Built to insure easy Job-Site Installation. **WRITE FOR BULLETIN #1203**

Model No.	Bucket Size Inches	First 20' (Discharge Ht.)	Add or Deduct Per Ft.
Style "A" Spaced Malleable Buckets on Chain			
C53A	5 x 3¾	$1071.50	$20.25
C64A	6 x 4	1088.50	21.00
C85A	8 x 5	1235.00	25.50
C106A	10 x 6	1281.00	27.50
C127A	12 x 7	1510.00	31.25
C148A	14 x 8	1673.00	36.00
Style "A" Spaced Malleable Buckets on Belt			
B53A	5 x 3½	$1099.00	$20.50
B64A	6 x 4	1116.50	21.25
B85A	8 x 5	1311.50	27.25
B106A	10 x 6	1692.50	33.00
B127A	12 x 7	1854.50	37.25
Style "E" Continuous Steel Buckets on Chain			
C85E	8 x 5 x 7¾	$1397.00	$31.25
C126E	12 x 6 x 11¾	1599.00	34.25
C108E	10 x 8 x 11⅜	1604.00	34.75
C128E	12 x 8 x 11⅜	1624.00	35.50
C148E	14 x 8 x 11⅜	1710.00	36.75
Style "E" Continuous Steel Buckets on Belt			
B85E	8 x 5 x 7¾	$1727.50	$34.50
B116E	11 x 6 x 8¾	1839.50	38.75
B128E	12 x 8 x 11⅜	2013.00	43.50

TESTED CONVEYOR BELTING*
SAVE UP TO 34%

WE PAY FREIGHT ON 200 POUNDS OR OVER



Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile. Heavy Duty 4-ply, 28-oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$3.63	$2.83
16"	4	4.08	2.97
18"	4	4.51	3.29
20"	4	4.97	3.80
24"	4	5.85	4.26
30"	4	7.18	5.21
36"	4	8.51	6.18

Major Bee Brand: 16# to 19# Average Friction Pull. 2400# to 3000# Average Cover Tensile. Skim coat between plies.
A high grade of heavy duty 4 and 5-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$4.31	$3.06
16"	4	4.85	3.46
18"	4	5.39	3.83
20"	4	5.90	4.37
24"	4	6.94	4.94
30"	4	8.53	6.07
36"	4	10.09	7.35
24"	5	8.14	5.78

*All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.

Other widths, plies, duck weights and cover thickness available at low prices. **WRITE FOR SAMPLE AND BULLETIN #1234.**

BONDED® IDLERS & RETURN ROLLS
SAVE 25% AND MORE

3-roll, 5" diameter Troughing Idlers for:			
14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.50
20" belt	22.10	48" belt	27.50
1-roll, 5" diameter Return Rolls for:			
14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.75	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213, HU. 6-3156**

110 BELLEVUE — **Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders** — **COLUMBUS 7, OHIO**

7 DIESEL ELECTRIC LOCOMOTIVES
25-Ton, 45-Ton, 80-Ton, 100-Ton, General Electric

HARDINGE MILLS
6' x 36" (2)

BALL MILLS
4½' x 5' Allis Chalmers
4' x 5' Miners Foundry
Nos. 56, 77 & 96 Marcy

TUBE MILLS
6' x 22' & 7' x 24' Allis Chalmers
7' x 18' Patterson 2 Compartment
7' x 35' Traylor 3 Compartment

ROD MILLS
5' x 10' Kennedy Van Saun
7' x 15' Marcy

HAMMERMILLS
24" x 18" Jeffrey Type A
24" x 20" Jeffrey Type B-3
30" x 48" Gruendler Model 3XE
Size 8 Williams Jumbo 350 H.P.

JAW CRUSHERS
14" x 28" New England Road Mach.
10" x 30" America Good Roads
16" x 16" New Pioneer
24" x 36" Pioneer
36" x 36" Traylor Type H
42" x 40" Allis Chalmers
56" x 72" Traylor Style G
36" x 42" Farrell Bacon

ROLL CRUSHERS
42" x 18" Traylor Type AA
24" x 16" Cedar Rapids
42" x 16" AA & 42" x 16" B Allis Chalmers

PORTABLE CRUSHING PLANTS
1—Model 2A Cedar Rapids Secondary 40 T.P.H.
1—Cedar Rapids Comander 150/200 T.P.H.

CAR PULLERS
2—Size 12 Stephen Adamson 10 H.P. 3/60/220/440

FEEDERS
2—Model F-45 & F-55 Syntron Grizzley Pans

GYRATORY CRUSHERS
10" Allis Chalmers Superior McCully
No. 6 McCully
12" Kennedy Van Saun Gearless
16B Telsmith
20" Allis Chalmers Superior McCully
25B Telsmith
No. 11 McCully

CONE & FINE REDUCTION CRUSHERS
No. 1 Sturtevant
No. 122 Allis Chalmers Hydrocone
2' Symons Standard
No. 19 Kennedy Van Saun
3' Symons Standard
4'0" Traylor Type TY
4¼' Symons Standard
350 H.P. Bradley Improved Mills

VIBRATING SCREENS
4' x 8' x 5' x 16' Symons Rod Deck
3' x 10' Telsmith Double Deck
5' x 14' Simplicity Triple Deck
6' x 20' Hewitt Robins Double Deck—"Hi-G"

ROTARY DRYERS
36" x 28' Ruggles Coles Class XF-1
5' x 30' Ruggles Coles Class XA-8

ROTARY KILNS
6' x 125' Vulcan

CLASSIFYING EQUIPMENT
No. 3 Wemco HMS Plant
12'-0" Link Belt Dewatering Rotoscope
2—Size 16 Telsmith Sand Settling Tanks
2—36" x 25' Eagle Twin Screw Fine Material Washer Classifier

DEHYDRATORS
2—60" Telsmith Sand Drags
1—20" x 15' Telsmith Twin Screw Classifier

R. C. STANHOPE, INC.
60 E. 42nd St. New York 17, N. Y.
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1—Abbe Rod Mill 3' x 12' Complete w/Drive.
4—Lancaster EAG-4 Mixers Complete w/ Drives
1—Lancaster EAG-3 Mixer Complete w/Drive.
1—Raymond #0000 Pulverizer Complete with Piping, Cyclone, Drive.
1—Briquetting Press Complete w/Drive, Feed Hopper, Etc.
2—Selas Gas Furnaces.
6—A-C 500 KVA Transformers 13800 to 480 V.

MISC. ELECTRICAL EQUIPMENT BUCKET ELEVATORS - MOTORS - CONVEYORS, Etc.

— CONTACT —

SAMUEL SONS IRON & STEEL CO.

Phone: Evergreen 8-4880

(Brooklyn, New York)

BEST BUY

Grinding Equipment

3—RAYMOND 4 Roller Hi Side Mills, Oil Journals, Dbl cone Separators, Fans & Cyclones

2—STURTEVANT #2 Rot. Fine Crushers, 6" to 8" infeed, ¼" to 1¼" final size'

2—ROTARY 4' x 25' Slackers, Complete, less motors

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Northwest - Bucyrus Erie - Lima - Marion - Link Belt - Lorain - P&H - Manitowoc - Shovels - Backhoes - Clam Drag - all sizes.

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P. O. Box 188 - Park Ridge, Illinois

LARGEST SELECTION

ROTARY KILNS—DRYERS—COOLERS

1—Traylor 11' x 155' Rotary Kiln, 7/8" shell.
1—Vulcan 10' x 8' x 125' Rotary Kiln, 5/8" shell.
1—Allis Chalmers 9' x 130' Rotary Kiln, ¾" shell.
4—Vulcan 8' x 125' Rotary Kilns, 5/8" shell.
1—Vulcan 8' x 87', ½" shell.
3—Louisville 8' x 50', 3/8" steel shell with 1/16" stainless steel lining.
2—Vulcan 7' x 80', ½" shell.
2—Vulcan 7' x 55', 5/8" shell.
1—Link Belt Roto Louvre Dryer, 7'5" x 24', monel.
2—Link Belt Roto Louvre Dryers, 6'4" x 24', stainless.
1—Allis Chalmers 6' x 60', ½" shell.
1—Rennenberg 6' x 50', 3/8" shell.
1—Rennenberg 5'6" x 50', 3/8" shell.
1—Ruggles Cole 5' x 30', class A-8, Indirect Heat Dryer, 3/8" shell.
1—Allis Chalmers 4' x 40'.
1—Allis Chalmers 4' x 30', 3/8" shell.
2—Ruggles Cole 4' x 20', 3/8" shell.
1—Link Belt Roto Louvre Dryer, 3'10" x 20'.
1—34" x 30', 5/16" shell.
1—Traylor 30" x 18', 3/16" shell, 430 S.S.

MILLS — CRUSHERS — PULVERIZERS

2—Traylor Compeb Mills 7' x 27' with 1—500 HP & 1—600 HP motor 3/60/440.
1—Williams Hammer Mill, 300 HP.
1—Allis Chalmers 6' x 22' Tube Mill, 250 HP.
1—Smidth 6' x 20' Tube Mill, 300 HP.
1—Smidth 5'6" x 21' Tube Mill.
1—Hardinge 4½' x 24" Steel Conical Ball Mill.
1—Denver 3' x 5' Continuous Ball Mill with steel liners.
1—Telsmith Reduction Crusher no. 46, 50 HP.
3—Kennedy 54" x 24" Two Roll Crushers.
2—Kennedy #6 Gyratory Crushers, 50 HP.
5—Jaw Crushers 12" x 18" to 36" x 48".
1—Penn. Non-Clog Swing Hammermill, size 5060, Hopper opening 47" x 60", cap., 200-275 tons per hour, requires 400 HP motor, UNUSED.
1—Penn. Super-Thor Hammermill, size SXT-13, 250 HP.
5—Raymond Bowl Mills, Two Roll, 60 HP.
3—Bradley Hercules Mills 6', Three Rolls, 300 HP.
3—Raymond 5 Roll Low Side Mills.

AIR SEPARATORS—SCREENS

1—18' dia. Raymond Double Whizzer Separator with 100 HP motor.
1—14' dia. Raymond Double Whizzer Separator with 60 HP motor.
2—Gayco 8' dia. mechanical Air Separators.
1—Raymond 30" dia. Double Whizzer Separator.
1—Dracco Dust Collecting System type DAAA-3 with Dracco Perfecto Filter #19 Clarage exhaust fan 2000 cfm, 10 HP motor.
1—Tyler Hummer Screen 4' x 10' type 38 with V-52 Vibrators and Thermionic unit.

ELEVATORS—CONVEYORS

14—Link Belt Bucket chain Elevators, 22' to 60' high.
1—24" Troughing Belt Conveyor 75', 7½ HP.
1—Robins 84" x 22' Feeder Conveyor, 15 HP.
1—Robins 24" x 14' Belt Conveyor, 3 HP.
1—Robins 18" x 30' Troughing Conveyor.
1—Fuller-Kinyon Conveying System, type H257, 100 HP.
2—Fuller-Kinyon Conveying Systems type 10-B-No. R, 75 HP.

For Inquiries on Boilers, Diesel Generator Sets, Turbo Generator Sets, Steam Engines, write to our Department P-2

BRILL EQUIPMENT COMPANY

2401 Third Ave. New York 51, N.Y.
Tel.: CYpress 2-5703

Wanted

Used 18" x 30"
Single Roll Heavy Duty
Toothed Crusher

UNION MINING CO.
Pittsburgh 22, Pa.

FOR SALE OR RENT

2½ YD. LINK-BELT CRANE-DRAGLINE. K-595. 140' BOOM & JIB. CAT. D17000 ENGINE
80 Ton GE Diesel Elec. Loco. New 1950.
44 Ton Gen. Elec. Diesel Elec. Loco.
25 Ton Gen. Elec. Diesel Elec. Loco.
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90 HP Lidgerwood 2d Diesel Hoist.

WHISLER EQUIPMENT CO.
1905 Railway Exchange Bldg. St. Louis 1, Mo.
CHestnut 1-4474

FOR SALE

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Whiting—Model TM3 Trackmobile
AC-HD21 Dozers
Buckets, Concrete, Clamshell
Electric Concrete Vibrators & Frequency Changers
G.D. Air Tracs, Wagon Drills, Jackhammers, etc.
Hoists, Pumps (Variety), Welding Machines, G. E. 300 Amp., Miscellaneous Items.

Send Inquiries

Walsh-Perini-Morrison-Kiewit-Utah Companies
Box 106, Massena, N. Y.

FOR SALE

Cedar Rapids Commander Tandem Crushing Plant, completely portable, S/N 19141, with 48" x 10' Screen, also attached Pre-Screening Unit, GMC 6-110 engine, S/N 6B13486, 10 x 36 jaw, 30 x 25 roller crusher, mounted on twelve 9:00 x 20 tires. Actually used three months. *Write or phone—*

H. H. Mass Construction Co.
OLiver 8-4551 Algonquin, Illinois

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1—American Hoist, Model 408 Locomotive Crane, Serial 1749. New 1939. Factory overhauled and modernized in 1954, straight diesel, Caterpillar D-17000 engine, outriggers. Working every day at St. Paul, Minn. Subject prior sale or other disposition.

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St. Paul 13, Minn. Midway 6-8601

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Pioneer 300 WAE Washer
Cedarapids Commander Tandem
Cedarapids Port. 20x36 Primary
Pioneer Port. 20x36 Primary
Euclids
Cranes
Crushers

AGGREGATE EQUIPMENT & SUPPLY CO.
811 Lehmann Bldg. Peoria, Ill.

TITANIUM PLANT

1—Traylor 11' x 155' Rotary Kiln, 2 tires, welded, 7/8" shell.
Steel building housing above kiln 32' x 202' x 40'.

1—Vulcan 8' x 50' Rotary Kiln, 2 tires, welded, 7/8" shell.

2—Vulcan 6' x 60' Rotary Kilns, 2 tires, 3/4" shell.

2—Abbe 5' x 16' Ball Mills.

3—Bucket Elevators; 125', 32', 30'.

2—Aurora 24" Vertical Centrifugal Pumps, 200 HP motors, 500 gpm, 125' head.

1—Bemis Automatic Bag Packer, Sewing Machine, Conveyor and Flattener.

1—Byron Jackson Deep Well Pump, 75 HP Vertical Motor.

1—8' x 8' Oliver Precoat Filter.

6—Dorr Thickener Mechanisms, 16'.

18—Steel Buildings 20' to 80' wide, x 60' to 140' long.

2—20 ton Overhead Cranes, 30' & 35' spans.

8—Redler Conveyors; 30', 35', 40', 75', 80' and 125' long.

200'—Screw Conveyor, 9" and 12".

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Genuine General Motors

71 SERIES LINER KITS

GMC #5194496 CONSISTS OF:

1—5188868 Liner
1—5193477 Ring Set
1—5154419 Piston
1—5153590 Piston Pin

INDIVIDUALLY PACKAGED

$22.50 Ea.

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FOR SALE

One 250 TPH Pioneer stationary Gravel washing & screening Plant.
One Universal 100 TPH stationary Gravel washing & screening Plant.
The above plants are complete in all respects and Equipment was new in 1955, and has had good maintenance.
3 Model #6 Northwest Draglines.
1 Model #603 Lima.
2 Model # 25 Northwest Draglines.
Miscellaneous: Trucks, Hoppers, Bins, Conveyors, Feeders, Tools, etc.

E. P. BRADY & CO.

16240 Tindall Rd., Davisburg, Mich.
Phone Holly ME 4-9471

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DEPENDABLE USED MACHINES

SPECIAL: Marion 33M Clamshell w/50' boom, 30" shoes powered by GM3030 eng.

Scout backhoe
A-W ½ yd. shovel
Hopto Scrap Grapple
Austin 8 ton roller
Unit 514 ½ yd. backhoe
Unit #614 ½ yd. dragline
Bay City Mod. 25 ½ yd. hoe
Adams Tandem Grader 42-C
Lorain 20 ton truck crane
HD-10 Allis Chalmers dozer
30"x73' B-G conveyor
5x14 Telsmith d.d. screen
5x16 Telsmith d.d. screen
Bay City 25 ½ yd. dragline
Trojan LC-100 front end loader

This equipment rebuilt in our modern plant by expert mechanics. Come see it!

10004 Southwest Highway **TRACTOR & EQUIPMENT CO.** **Oak Lawn, Illinois**

BEST BELT BUYS

2500-3000# cover tensile, 16-19# friction pull. Brand new factory guarantee. 3 weeks delivery.

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4 ply 28 oz. duck:			
14"	1/8" x 1/32"	$4.30	$2.43
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18"	1/8" x 1/32"	$5.35	$3.04
18"	1/8" x 1/16"	$5.68	$3.20
20"	1/8" x 1/32"	$5.90	$3.32
24"	1/8" x 1/32"	$6.95	$3.92
4 ply 32 oz. duck:			
24"	1/8" x 1/16"	$7.79	$4.14
30"	1/8" x 1/16"	$9.30	$4.99

Many other sizes. Samples free. Distributors protected.

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New Canaan, Conn. **WO 6-4073**

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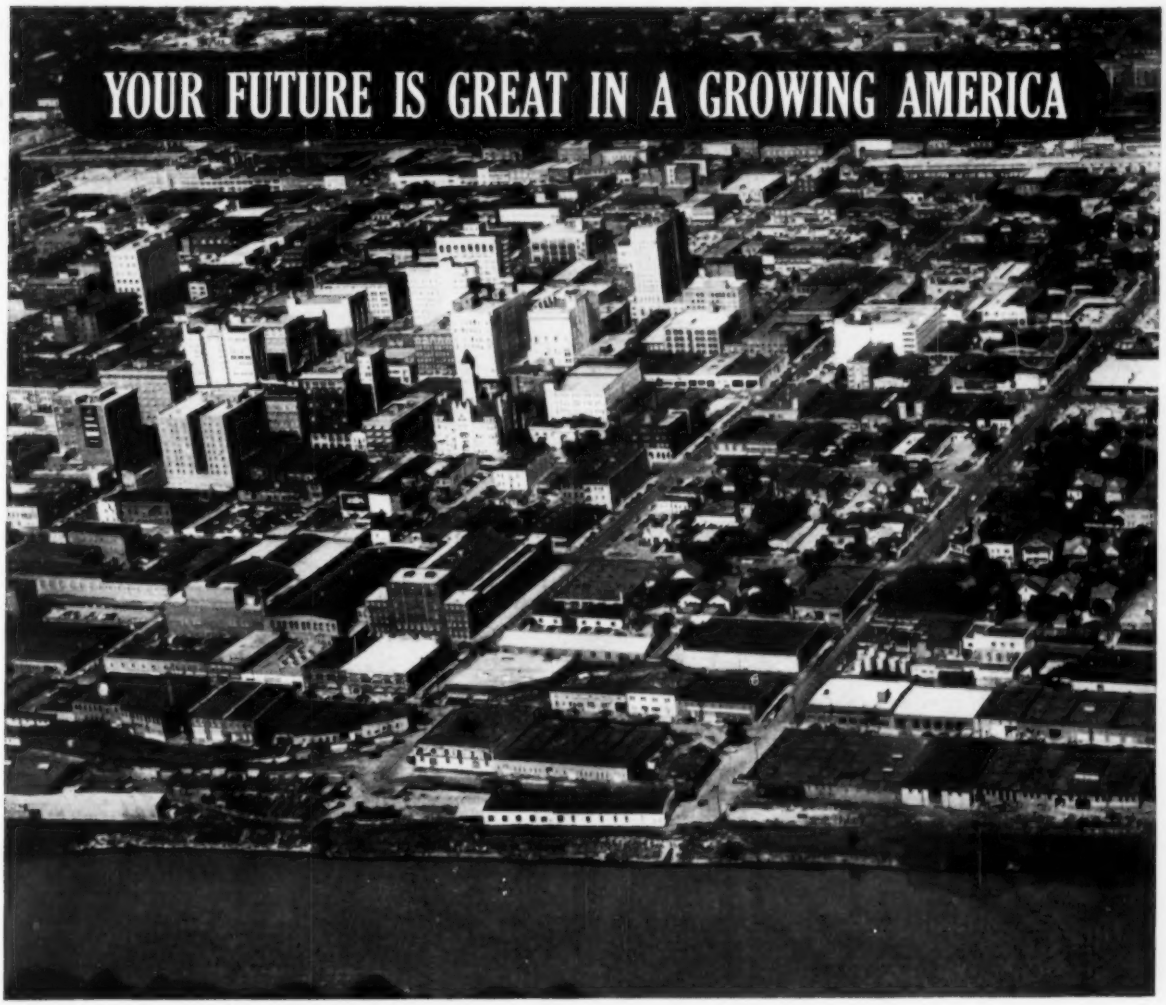
Bay City No. 42—¾ yd. crane, 55' boom good condition—price $5500.00
¾ yd. Heavy duty material handling bucket, good condition—price $850.00
60 ton per hour chain bucket elevator, new condition—price $2500.00
Dry Mix Concrete Plant which includes: 80 ton Caldwell wooden bin, Two compartment steel bin with scales, mixer, dryer, sewing machine, bag conveyor, and automatic scales —price $4800.00

THE McENERY COMPANY

13th and Myrtle Streets **Erie, Penna.**



THE CITY THAT DIDN'T EXIST A MONTH AGO

Every 30 days the U.S. adds as many new Americans as live in Norfolk, Va.—creating brand-new wants and needs which must be satisfied.

What does this mean to you? It means greater opportunities than ever before—in all fields. Home construction is expected to double by 1975. Power companies plan to increase output 250% in the next 20 years to provide the power for scores of new labor-saving devices. Clothing suppliers predict a one-third increase in 7 years.

With 11,000 new citizen-consumers born every day, there's a new wave of opportunity coming.

7 BIG REASONS FOR CONFIDENCE IN AMERICA'S FUTURE

1. **More people** . . . Four million babies yearly. U.S. population has *doubled* in last 50 years! And our prosperity curve has always followed our population curve.
2. **More jobs** . . . Though employment in some areas has fallen off, there are *15 million* more jobs than in 1939—and there will be *22 million more* in 1975 than today.
3. **More income** . . . Family income after taxes is at an all-time high of $5300—is expected to pass $7000 by 1975.
4. **More production** . . . U.S. production *doubles* every 20 years. We will require millions more people to make, sell and distribute our products.
5. **More savings** . . . Individual savings are at highest level ever—*$340 billion*—a record amount available for spending.
6. **More research** . . . *$10 billion* spent each year will pay off in more jobs, better living, whole new industries.
7. **More needs** . . . In the next few years we will need *$500 billion* worth of schools, highways, homes, durable equipment. Meeting these needs will create new opportunities for everyone.

Add them up and you have the makings of another big upswing. Wise planners, builders and buyers will act *now* to get ready for it.

FREE! Send for this new 24-page illustrated booklet, "Your Great Future in a Growing America." Every American should know these facts. Drop a card today to: ADVERTISING COUNCIL, Box 10, Midtown Station, New York 18, N. Y.

(This space contributed as a public service by this magazine.)

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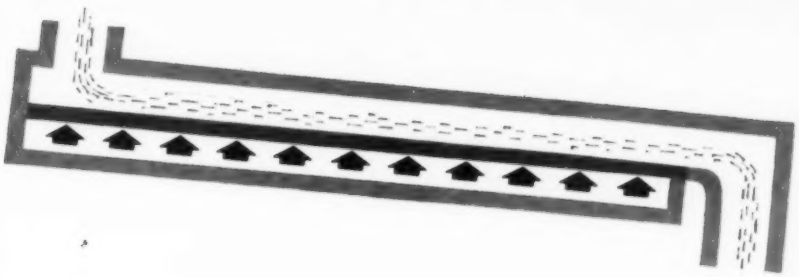
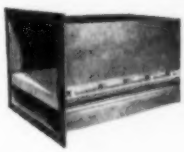
KENNEDY

AIR FLOAT

the better-built, more efficient
air-gravity conveyor
provides the answers to
Dry Solids Conveying



The special porous plate is exclusive with KENNEDY AIR-FLOAT. It is strong, resistant to abrasion and temperature and has a smooth surface texture.



Sections are ruggedly designed, formed on modern production equipment and completely assembled before shipment.

Q. How does AIR-FLOAT work?

A. *The dry material to be conveyed is fed on to a smooth, rigid, porous plate through which low pressure air continuously diffuses. Because the conveyor is inclined about 6 to 8°, the aerated material flows by gravity.*

Q. What distinguishes the KENNEDY AIR-FLOAT from other air-gravity conveyors?

A. *Primarily, the special porous plate. Also the casing is of heavier construction, flanged and channeled for greater rigidity.*

Q. How is this special plate better than other porous media?

A. *The AIR-FLOAT porous plate has literally millions of tiny pores through which the air diffuses uniformly for thorough aeration of the conveyed material. The plate is thicker, stronger, temperature- and wear-resistant, and has a very smooth surface texture.*

Q. How does this improve conveying?

A. *AIR-FLOAT has a much higher capacity than competitive air-gravity conveyors. Blind spots are eliminated and the angle of inclination is less critical.*

Q. What about maintenance?

A. *The KENNEDY AIR-FLOAT is the nearest thing to a completely maintenance-free conveyor that has ever been devised.*

Q. Can turns be made?

A. *Direction changes up to 45° are made with standard pieces. These can be combined for greater angles.*

Q. Are accessories available?

A. *Yes. End and side discharge boxes, splitters, control gates, transitions, bin extractors and required blowers can be provided.*

Q. Have KENNEDY AIR-FLOAT Conveyors been fully tested and proven?

A. *Yes. For more than 12 years AIR-FLOAT Conveyors have been successfully used in KENNEDY-designed cement and lime plants. With this background of experience, KENNEDY is now making AIR-FLOAT available to industry, mass producing it to sell at competitive prices.*

For more information on AIR-FLOAT, ask for Bulletin 58-K.

KENNEDY VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

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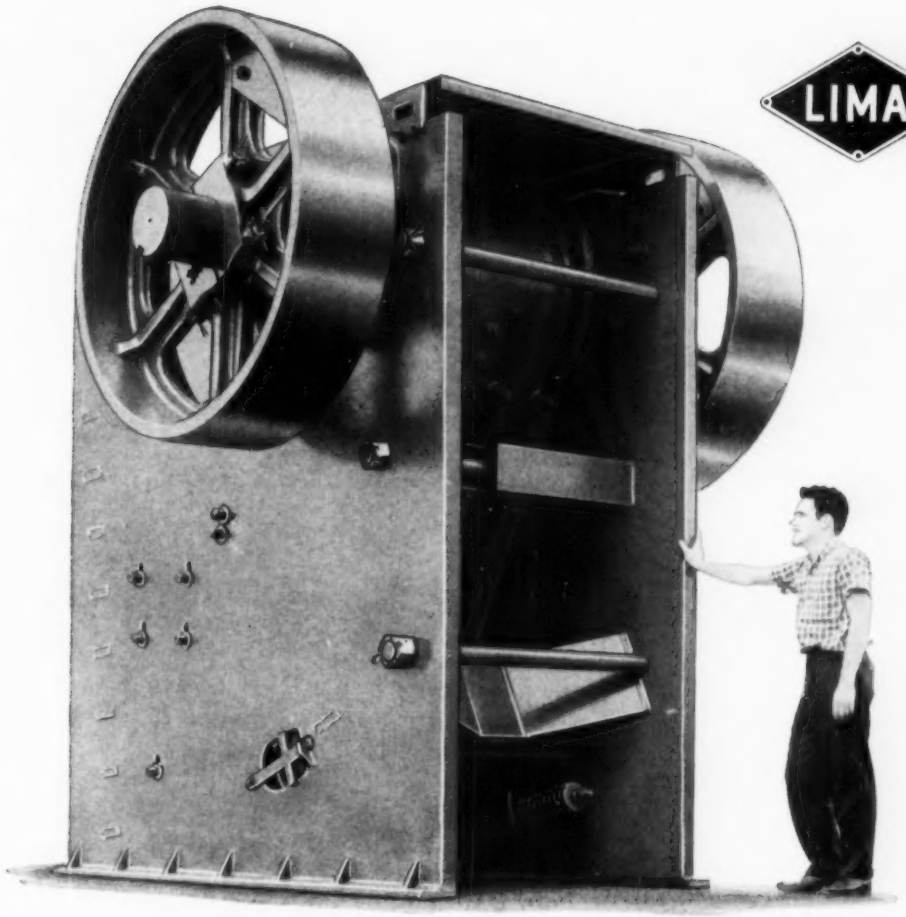


Lima Austin-Western Model 4248 overhead eccentric roller bearing Jaw Crusher

LIMA A-W 42x48-in. Jaw Crusher produces more rock for less

Speed up crusher output with giant Lima Austin-Western 42 by 48-in. overhead eccentric roller bearing Jaw Crusher. Quality built to outperform! Oversized shafts and roller bearings for extra strength and durability. Extra-deep jaws of tough manganese steel form smaller, sharper and more efficient crushing angle.

main frame is practically unbreakable. Low alloy, high strength 3-in. steel plate gives frame tremendous strength in proportion to its weight.

flywheels are heavy castings, precision machined to proper balance. Split-type hubs simplify flywheel removal. Flywheels are key-locked into place, can't back off in operation.

pitman and shaft assembly can be easily removed through crusher frame top. Cartridge-type housing holds assembly in place, eliminates possibility of loose bearings.

bearings—Both main and pitman bearings are oversized and self-aligning to permit some shaft deflection, and deviation is minimized by locating the bearings close together. Frame absorbs part of shock load as main bearing center lines are within sides of main frame.

Bearings are protected by a simple-type steel labyrinth seal which resists entrance of dirt and seals in lubricant. Bearings may be easily removed by use of a hydraulic system furnished with this model.

capacity—What the Model 4248 can do for you may be seen from the fact that it handles 240-360 tons an hour when set at 5-in. discharge opening; estimate based on 2700 lb. per cu. yd.

Lima Austin-Western also produces a complete line of crushing and screening equipment and portable and stationary plants. Other smaller sizes of roller bearing Jaw Crushers are also available.

Profit from our 73 years' experience manufacturing Jaw Crushers and equipment for pit and quarry. Engineered and built to *produce more rock at less cost!* See your Lima Austin-Western distributor now or write us for free bulletin.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

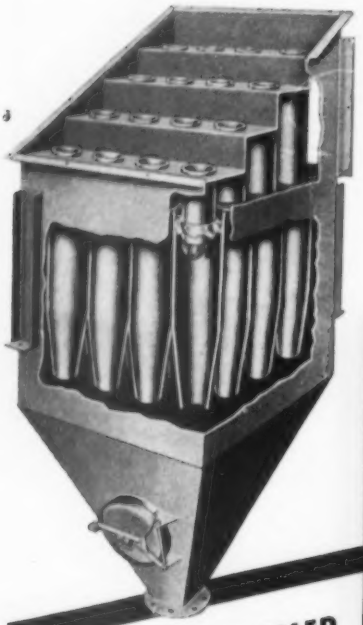
LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

5928

13 BIG REASONS WHY MULTICLONE DUST COLLECTORS



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✔ ARE FAR SIMPLER TO SERVICE!

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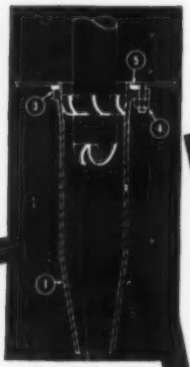

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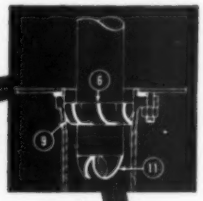

PRECISION CAST VANES!

6. **CAST IRON VANES** resist erosion!
7. **SPECIAL ALLOY VANES** (FBA Inco #40, Chromehard and Ni-Hard) can be supplied where high temperatures or severe erosion are problems!
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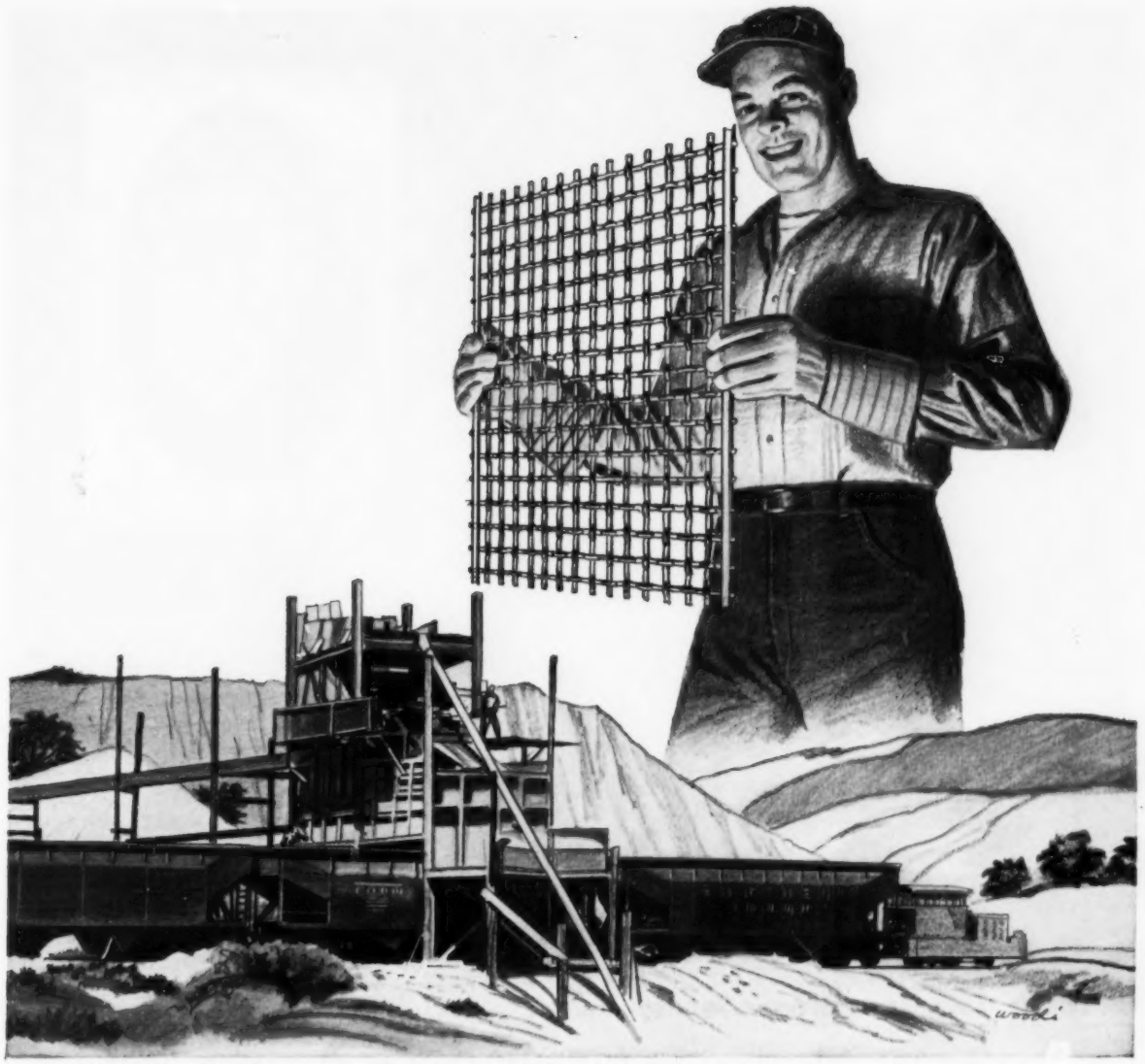

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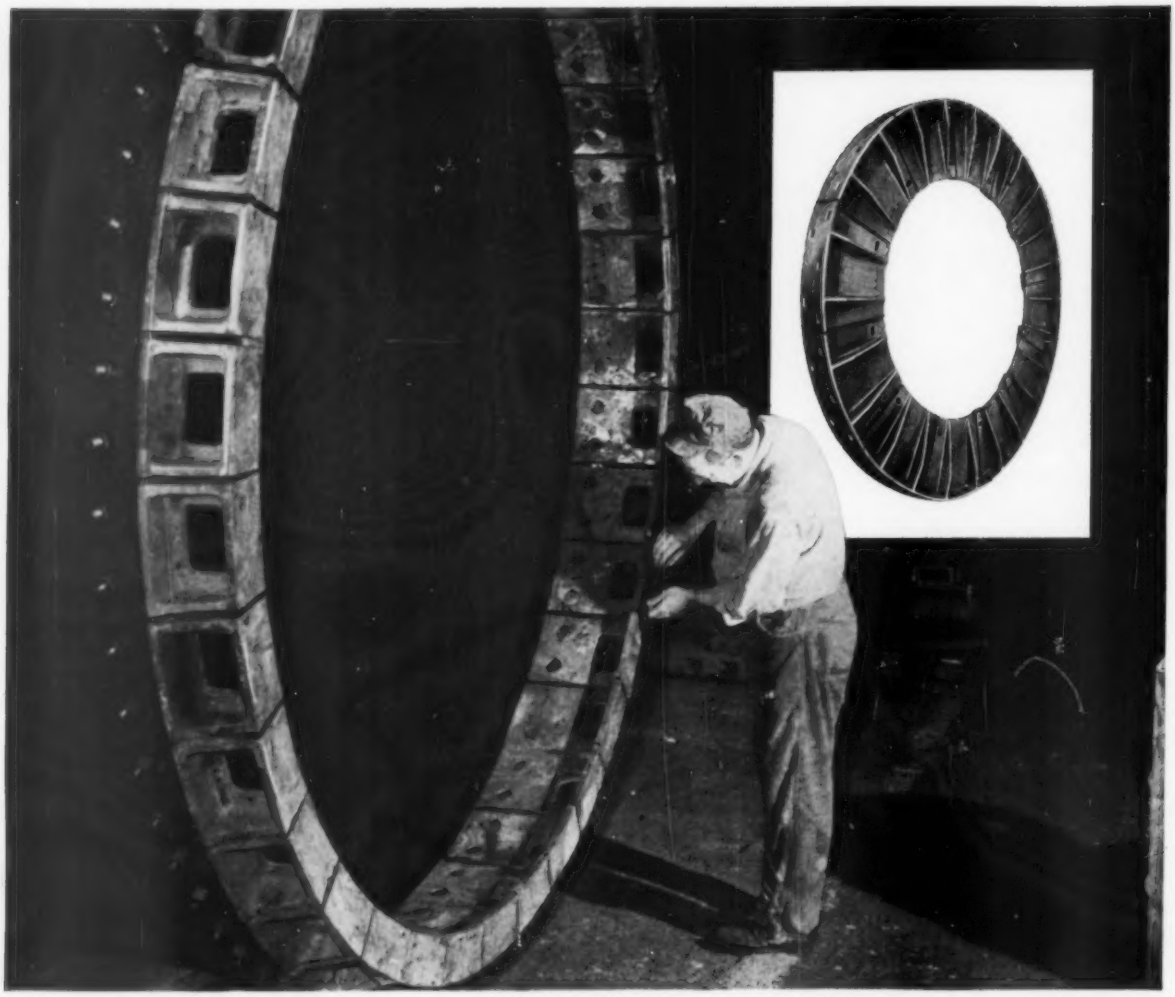

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